369

CONTENTS

SAMS PHOTOFACT* SET No. 369

*TRADEMARK

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

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Admiral	7M12, 7M14, 7M16, 7M18 (Ch. 7M1)	369-1
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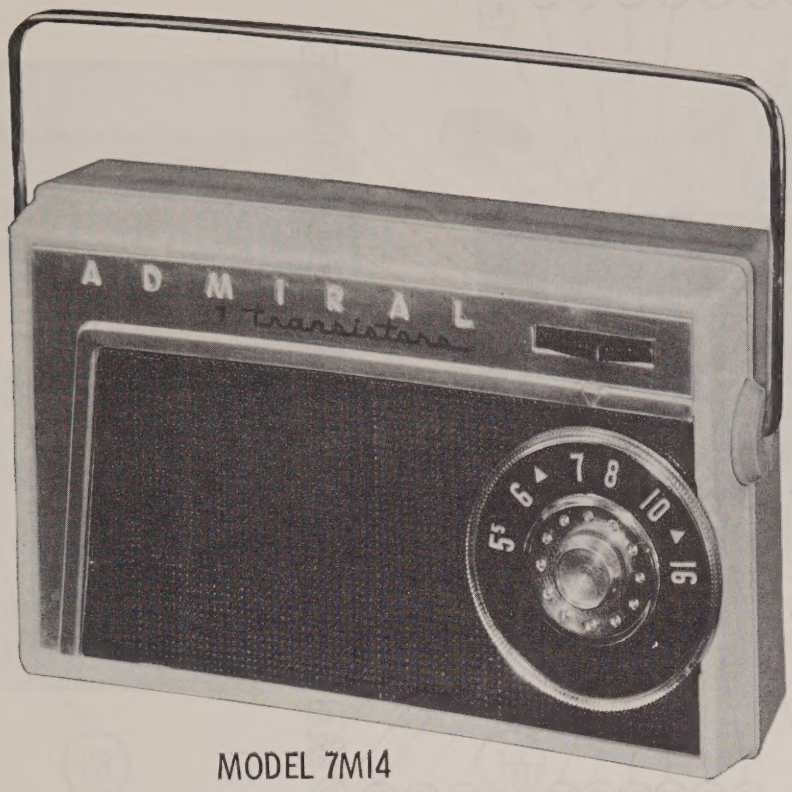

MODEL 7M14

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

ADMIRAL
CHASSIS 7M1

ADMIRAL
CHASSIS 7M1

TRADE NAME	Admiral Models 7M12, 7M14, 7M16, 7M18 (Ch. 7M1)
MANUFACTURER	Admiral Corp., 3800 W. Cortland St., Chicago 47, Ill.
TYPE SET	Battery Operated Portable AM Transistorized Receiver
POWER SUPPLY	6 Volts DC
RATING	9.8MA@ 6 Volts DC
TUNING RANGE—BROADCAST	535KC - 1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1		Loop	455KC (400~ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2		"	1620KC	"	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Repeat step 1 until no further increase is obtained.
3		"	1400KC	Tune to 1400KC signal	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
	The following step is not necessary unless it is impossible to tune in 535KC. Adjust oscillator trimmer (A4) 1/4 turn from tight position.						
4		Loop	535KC	Tuning gang fully closed	Across voice coil	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Repeat steps 2 & 4 (with step 2 last) until required range can be covered. Repeat steps 3 & 1 in that order.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA		NOTES
			CBS PART No.	SYLVANIA PART No.	
X1	2N219	Converter			
X2	2N218	1st. IF Amplifier			
X3	2N218	2nd. IF Amplifier			
X4	39A9	Overload Limiter			
X5	2N217	Driver			
X6	2N217	Output			X6 & X7 are a matched pair.
X7	2N217	Output			X6 & X7 are a matched pair.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	ADMIRAL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	60	6	67B32-8	XPP6V60	NL60-6	TT6X60	ML75-6		TE-1101
C2	60	6	67B32-8	XPP6V60	NL60-6	TT6X60	ML75-6		TE-1101
C3	40	3	67B32-9	XPP3V40	NL40-3	TT3X40	ML40-6		TE-1057
C4	10	3	67B35-6	XPP3V10	NL10-3	TT3X10	ML10-6		TE-1053
C5	90	3	67B32-10	XPP3V100	NL110-3	TT3X110	ML100-3		TE-1060

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	ADMIRAL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C6	50000		65B45-2	BPD-05	DF-503				5HK-S5	
C7	10000		65D10-41	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C8	8.2		65D10-131	NP0-SI 8.2		C10V82C	TCO-8.2			
C9	50000		65B45-2							
C10	4.0		65D6-124			C10V4C				
C11	50000		65B45-2							
C12	50000		65B45-2							
C13	50000		65B45-2							
C14	8.0		65D6-125			LT6V8				
C15	50000		65B45-2							
C16	50000		65B45-2							
C17	50000		65B45-2							
C18	50000		65B45-2							
C19	10000		65D10-41	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C20	50000		65B45-2							

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ADMIRAL PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	2500Ω	1/4	75B36-1					Volume & Switch

RESISTORS

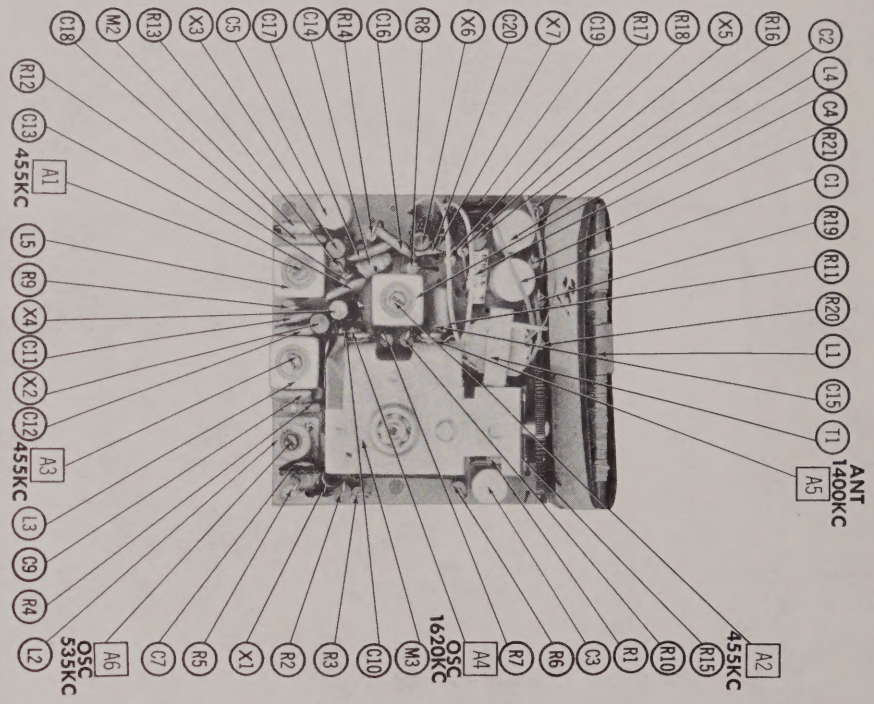
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ADMIRAL PART No.	IRC PART No.	
R2	8200Ω		60B8-822	BTS-8200	
R3	6800Ω		60B8-682	BTS-6800	
R4	560Ω		60B8-561	BTS-560	
R5	3900Ω		60B8-392	BTS-3900	
R6	47K 5%		60B7-473	BTS-47K 5%	
R7	6800Ω		60B8-682	BTS-6800	
R8	2700Ω		60B8-272	BTS-2700	
R9	470Ω		60R8-471	BTS-470	
R10	2200Ω		60B8-222	BTS-2200	
R11	18K		60B8-183	BTS-18K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ADMIRAL PART No.	IRC PART No.	
R12	3300Ω		60B8-332	BTS-3300	
R13	220Ω		60B8-221	BTS-220	
R14	470Ω		60B8-471	BTS-470	
R15	2700Ω		60B8-272	BTS-2700	
R16	22K		60B8-223	BTS-22K	
R17	2700Ω		60B8-272	BTS-2700	Note 1
R18	390Ω		60B8-391	BTS-390	
R19	3900Ω		60B8-392	BTS-3900	
R20	100Ω		60B8-101	BTS-100	
R21	100Ω		60B8-101	BTS-100	

Note 1. Early production used 4700Ω (Part #60B8-472).

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (DRIVER)

ITEM No.	Turns Ratio		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ADMIRAL PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1:	1	79B67-3	GH110			TR-2 ①		① Tape center tap on primary winding.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ADMIRAL PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	500Ω CT	14Ω	79B68-4	GH105			TR-18		

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ADMIRAL PART No.	QUAM PART No.	
SP1	2 3/4"	PM	14Ω	78B125		

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		ADMIRAL PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Stick	69B218-1				
L2	Osc. Coil	69B213-2				
L3	1st. IF	72C182-1				
L4	2nd. IF	72C182-2				
L5	3rd. IF	72C182-3				

BATTERIES

ITEM No.	VOLTAGE	ADMIRAL PART No.	REPLACEMENT DATA								NOTES
			BURGESS		EVEREADY		MALLORY		RAY-O-VAC		
			"A"	"B"	"A"	"B"	"A"	"B"	"A"	"B"	
M1	1. 5V		Z		915 or Mercury E502		M-15 or Mercury RM502R		7-R		4 used in series

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		ADMIRAL PART No.	CBS PART No.	SYLVANIA PART No.	
M2	1N295		1N60	1N60	Audio Det.

MISCELLANEOUS

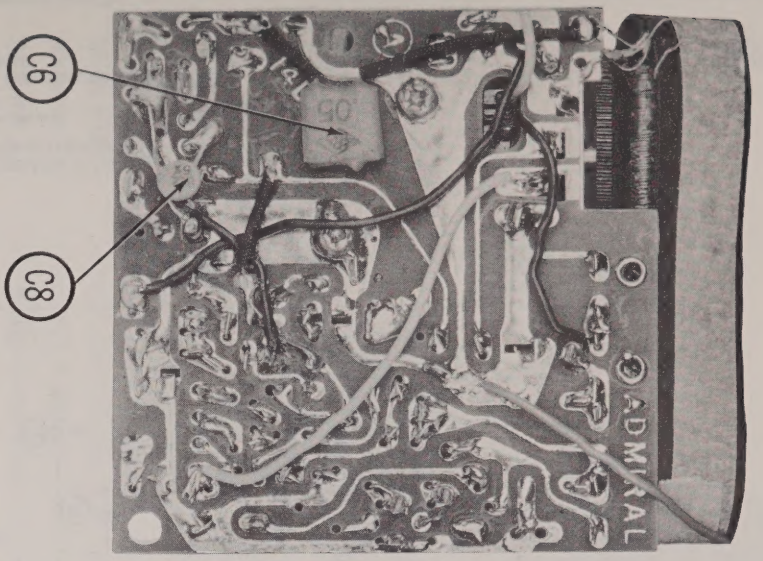
ITEM No.	PART NAME	ADMIRAL PART No.	NOTES
M3	Tuning Cap.	68B-67-1	2 Gang (Ant. 8-130MMF)

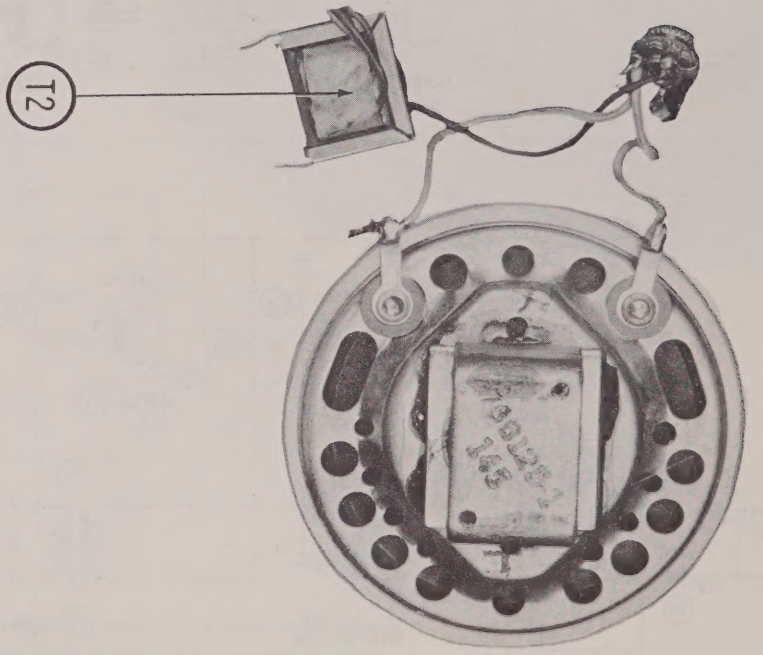
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

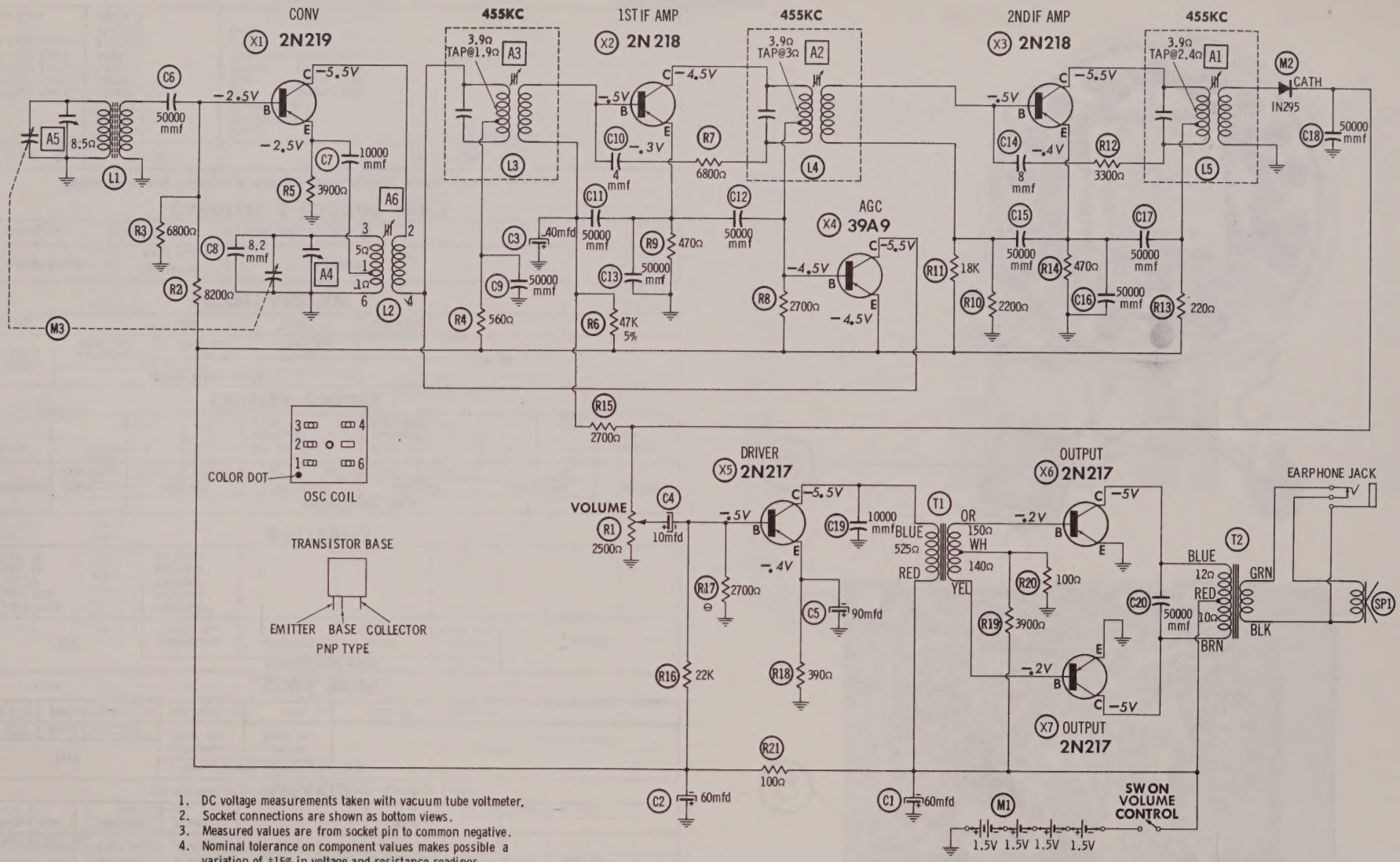
NAME	PART NO.	DESCRIPTION
Knob	33C217-1	Tuning
Knob	33C217-2	On-Off-Volume
Screw	27A232	Tuning Knob
Cabinet Back Ass'y.	A5582	Red Model 7M12
Cabinet Back Ass'y.	A5650	Tan Model 7M14
Cabinet Back Ass'y.	A5652	Yellow Model 7M16
Cabinet Back Ass'y.	A5651	Turquoise Model 7M18
Cabinet Front Ass'y.	34E115-10	White
Handle	37A155-1	Gold
Earphone Jack	88B39-3	

CHASSIS—BOTTOM VIEW





ADMIRAL MODEL 7M12 (Ch. 7M1)



1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum. no signal aplied for voltage measurements.

RESISTANCE READINGS NOT TAKEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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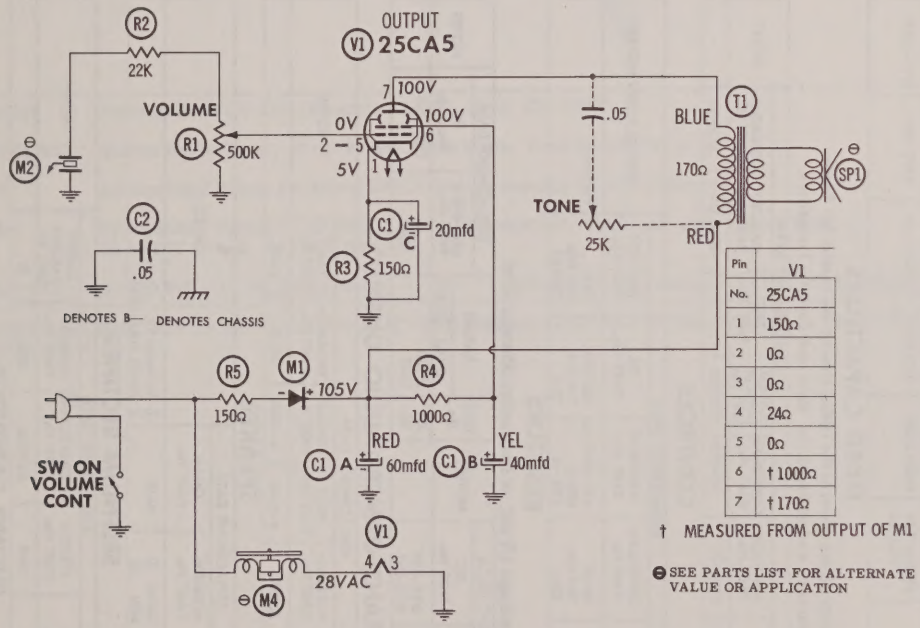
AIRLINE
MODELS GAA-861A, GAA-862A, GAA-863A

MODEL GAA-861A

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

AIRLINE
MODELS GAA-861A, GAA-862A, GAA-863A

TRADE NAME	Airline Models GAA-861A, GAA-862A, GAA-863A
SUPPLIER	Montgomery Ward & Co., 610 Chicago Ave., Chicago, Ill.
TYPE SET	AC Operated Phono Amplifier With 4 Speed Manual Record Player
TUBES (One)	Type 25CA5 Output
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .35 Amp. @ 117 Volts AC (30 Watts With Motor)



Pin No.	V1 25CA5
1	150Ω
2	0Ω
3	0Ω
4	24Ω
5	0Ω
6	† 1000Ω
7	† 170Ω

† MEASURED FROM OUTPUT OF M1

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Output	25CA5	

ITEM No.	USE	TYPE	NOTES

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA AIRLINE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	60	150	1016	PRS150/25V 5050/20	BBRT5515C	TCT3117	TDLT-18	FMT-333	TVL-3436
B	40	150							
C	20	25							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA AIRLINE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	05	200		BPD-05	DF-503	CUB2S5		GEM-215	2TM-S5	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA AIRLINE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	412	B-60	A47-500K-Z	Q13-133	U48	Volume
B	Shaft			Not req.	KSS-3	Not req.	Not req.	
C	Switch			KB-1	SWE-12	76-1	US-26T	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA AIRLINE PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R2	22K			BTS-22K	
R3	150Ω			BTS-150	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA AIRLINE PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R4	1000Ω			BTS-1000	
R5	150Ω		633		

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA AIRLINE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	4000Ω	3-4Ω	Part of speaker	Z1000	A-3026	A-3856	22S45	S-6X	

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA AIRLINE PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	4"	PM	3-4Ω	2623A ① 2631 ②	4A07	① Includes T1 ② Model GAA-863A

SELENIUM RECTIFIER

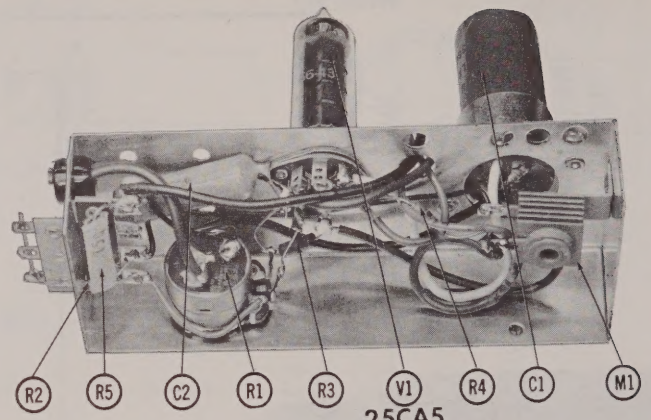
ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA AIRLINE PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	NOTES
M1	.028A	2723	1386	RS065Q	6S65	65	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA AIRLINE PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. MOUNT	REMARKS
M2	60-49	* P-310-T				Model GAA-863A * Tone Arm complete with cartridge
	60-39	106	N-6-2			Models GAA-861A, GAA-862A

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

CHASSIS—BOTTOM VIEW



25CA5

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA AIRLINE PART No.	REPLACEMENT DATA JENSEN PART No.	REPLACEMENT DATA WALCO PART No.	REMARKS
M3	61-45	† W-57 or † W-57LP or † W-58 or † W-58LP or ♦ W-58D or ♦ W-58LPD	† W-64S or † W-64MGS	Model GAA-863A
	61-43	† W-122	* W-40AGA	Models GAA-861A, GAA-862A

* Metal † Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	AIRLINE PART No.	NOTES
M4	Phono Motor	2584	Alternate Part #2594

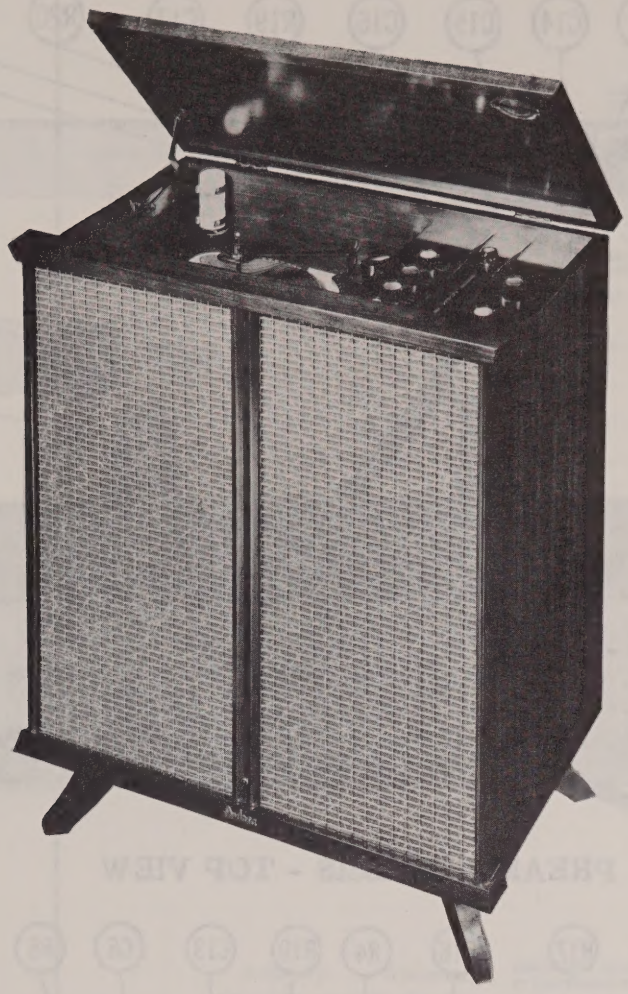
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	2429B	Model GAA-861A
Knob	2429	Volume, Models GAA-862A, GAA-863A
Knob	2429A	Tone, Models GAA-862A, GAA-863A

ANDREA
MODEL CP-12W (Ch. PA, P12W)

ANDREA
MODEL CP-12W (Ch. PA, P12W)



PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

ANDREA
MODEL CP-12W (Ch. PA, P12W)

TRADE NAME	Andrea Model CP-12W (Preamp. Ch. PA, Amp. Ch. P12W)
MANUFACTURER	Andrea Radio Corp., 27-01 Bridge Plaza North, Long Island City 1, N. Y.
TYPE SET	AC Operated Phono Amplifier With 3 Speed Automatic Record Changer
TUBES (Six)	Types 12AD7 Preamp. -AF Amp., 6AV6 AF Amplifier, 12AX7 AF Amp. -Phase Inv., (2) 6V6GT Output, 6AX5GT Rectifier
POWER SUPPLY	110-120 Volts AC-50/60 Cycles RATING .64 Amp. @ 117 Volts AC (63 Watts)

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE SIMILAR GARRARD MODEL RC-121D - PHOTOFACT SET 355 FOLDER 4

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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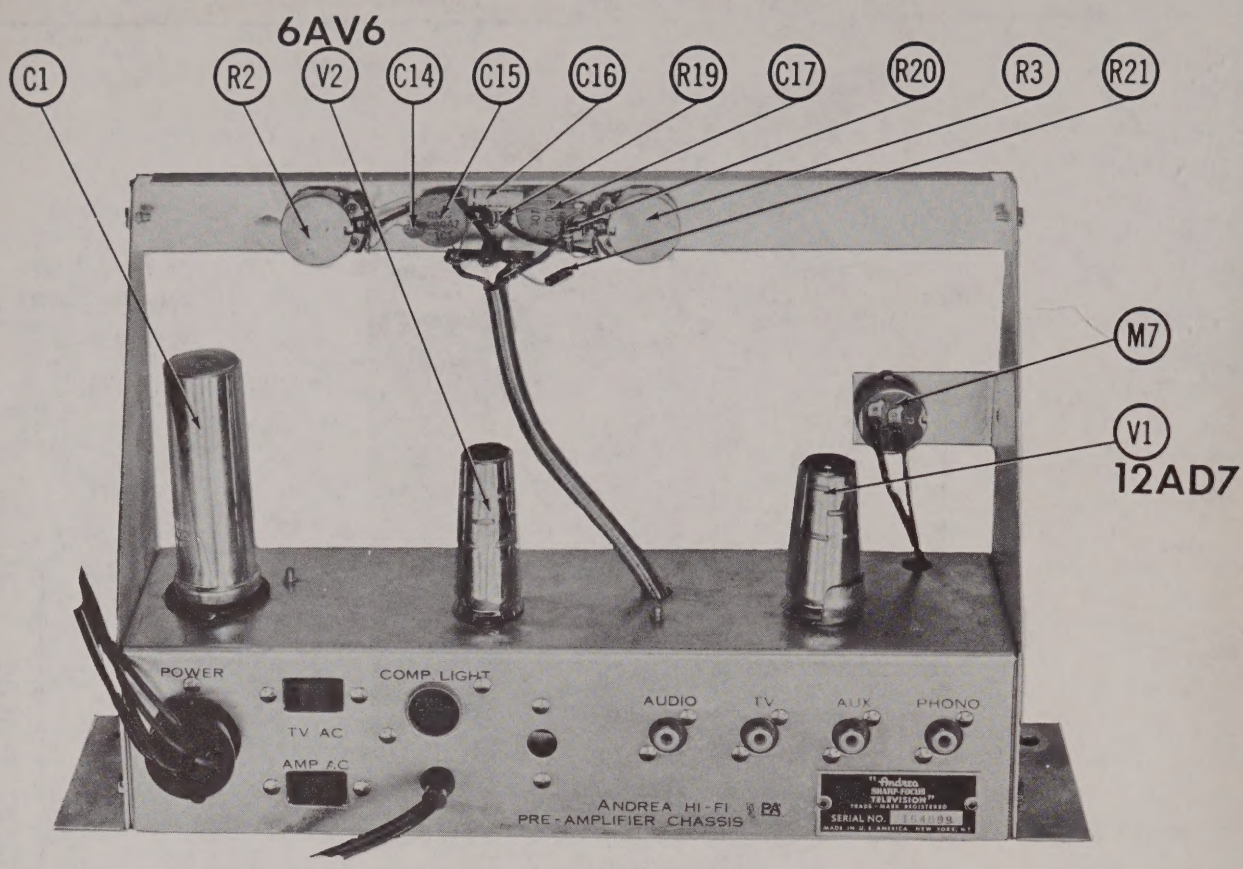
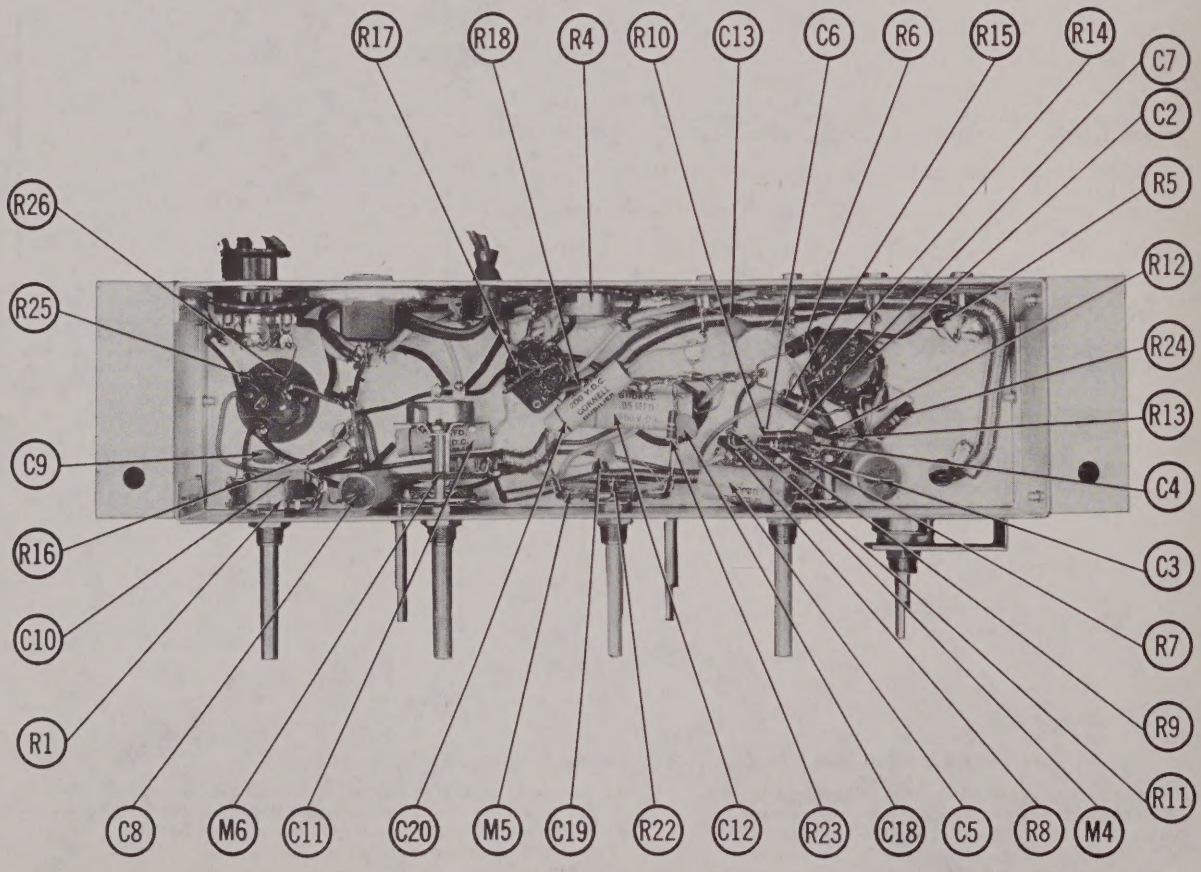


PREAMP CHASSIS - TOP VIEW



PREAMP CHASSIS - BOTTOM VIEW

PRE AMP
PARTS LIST AND DESCRIPTIONS
TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Phono Preamp. -AF Amp.	12AD7	

ITEM No.	USE	TYPE	NOTES
V2	AF Amplifier	6AV6	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	ANDREA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲20	450	HCE-1346	AFH2-51	B0400	FP234	TMD-49	D-215	TVL-2755
B	■20	450							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	ANDREA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	1500		HCC-1955	BPD-0015	DD-152	BYA10D15	ED-0015	DC-5215	5HK-D15	
C3	.1	600	HCT-1002	P688N-1	DF-104	CUB6P1		GEM-601	6TM-P1	
C4	3900		HCC-1953	BPD-004	DD-402	BYA10D4	ED-004	UC-524	5GA-D4	
C5	.03	600	HCT-1032	BPD-03	DF-303	CUB6S3		GEM-613	6TM-S3	
C6	820		HCC-1957	BPD-00082	DD-821	BYA10T82	ED-820	UC-5382	5GA-T82	
C7	820		HCC-1957	BPD-00082	DD-821	BYA10T82	ED-820	UC-5382	5GA-T82	
C8	.05	600	HCT-1012	BPD-05	DF-503	CUB6S5		GEM-615	6TM-S5	
C9	220		HCC-1960	BPD-00022	DD-221	L10T22	ED-220	UC-5322	5GA-T22	
C10	.01	100	HCT-1042	BPD-01	DD-103	CUB2S1	GP-10000	GEM-211	2TM-S1	
C11	.05	200	HCT-1004	BPD-05	DF-503	CUB2S5		GEM-215	2TM-S5	
C12	.05	600	HCT-1012	BPD-05	DF-503	CUB6S5		GEM-615	6TM-S5	
C13	220		HCC-1960	BPD-00022	DD-221	L10T22	ED-220	UC-5322	5GA-T22	
C14	680		HCC-1958	BPD-00068	DD-681	BYA10T68	ED-680	UC-5368	5GA-T68	
C15	4700		HCC-1952	BPD-0047	DD-472	BYA10D47	ED-0047	UC-5247	5HK-D47	
C16	.01	100	HCT-1042	BPD-01	DD-103	CUB2S1	GP-10000	GEM-211	2TM-S1	
C17	4700		HCC-1952	BPD-0047	DD-472	BYA10D47	ED-0047	UC-5247	5HK-D47	
C18	820		HCC-1957	BPD-00082	DD-821	BYA10T82	ED-820	UC-5382	5GA-T82	
C19	470		HCC-1959	BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C20	.05	200	HCT-1004	BPD-05	DF-503	CUB2S5		GEM-215	2TM-S5	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ANDREA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500K	½	GRV-851		A47F4-500K	Q18-133X	UT-429	Loudness, Tap@ 50K
B	Shaft				FS-3	Not req.	Not req.	
R2A	1Meg	½	GRV-855	B-68		Q17-137	U52	Treble
B	Shaft			Not req.		Not req.	Not req.	
R3A	1Meg	½	GRV-853	B-70	A47-1Meg-Z	Q13-137	U53	Bass
B	Shaft			Not req.	FS-3	Not req.	Not req.	
R4	500Ω	2	GRV-856					Hum Balance (Wire Wound)

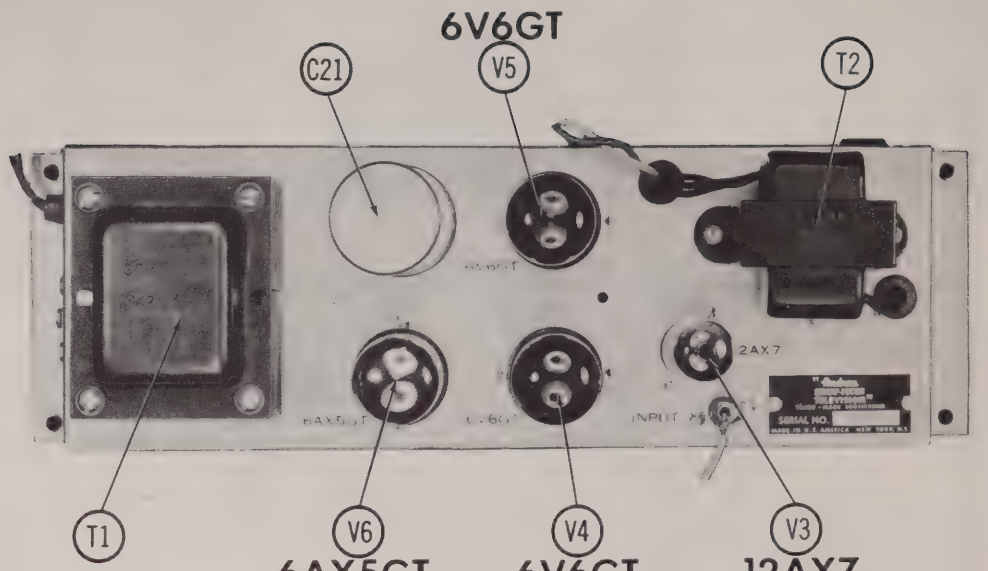
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

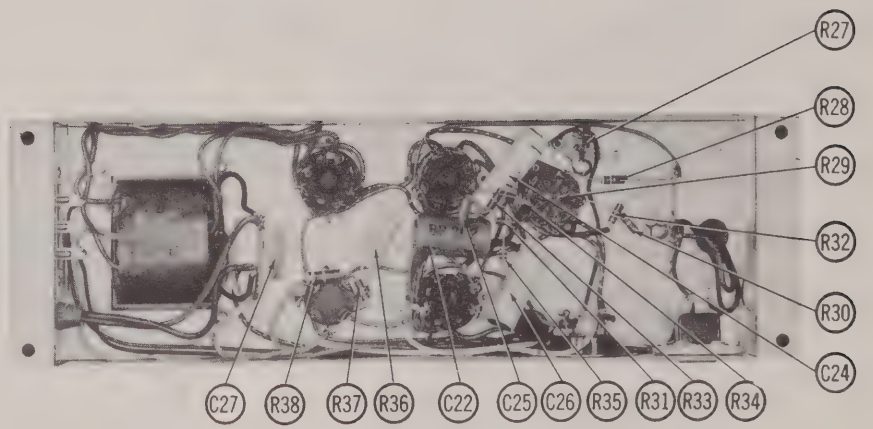
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ANDREA PART No.	IRC PART No.	
R5	22K		GRC-201	BTS-22K	
R6	220K	1		BTA-220K	
R7	2700Ω		GRC-275	BTS-2700	
R8	100K		GRC-258	BTS-100K	
R9	680K		GRC-302	BTS-680K	
R10	2.2Meg		GRC-317	BTS-2.2Meg	
R11	51K 5%		GRC-352	BTS-51K 5%	
R12	22K		GRC-201	BTS-22K	
R13	22K		GRC-201	BTS-22K	
R14	10Meg		GRC-208	BTS-10Meg	
R15	100K	1	GRC-349	BTA-100K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ANDREA PART No.	IRC PART No.	
R16	8200Ω		GRC-285	BTS-8200	
R17	10Meg		GRC-208	BTS-10Meg	
R18	68K	1	GRC-350	BTA-68K	
R19	220K		GRC-270	BTS-220K	
R20	100K		GRC-258	BTS-100K	
R21	22K		GRC-201	BTS-22K	
R22	47K		GRC-207	BTS-47K	
R23	47K		GRC-207	BTS-47K	
R24	5.6Ω 5%		GRC-293		
R25	22K		GRC-201	BTS-22K	
R26	22K		GRC-201	BTS-22K	

AMP
CHASSIS—TOP VIEW



CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	ANDREA PART No.	JENSEN PART No.	WALCO PART No.	
M1		† G-1 or † G-3 or ♦ G-3D or ♦ G-ID	† W-68S or † W-68MGS or ♦ W-68D or ♦ W-68MGD	† Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	ANDREA PART No.	NOTES
M2	Pilot Light		#7C7 Type, 7 Watt
M3	Switch	FM-5432	Phono Compartment Light
M4	Switch	FM-5443	Compensating, Rotary Wafer Type
M5	Switch	FM-5444	Filter, Rotary Wafer Type
M6	Switch	FM-5442	Selector, Rotary Wafer Type
M7	Switch	FM-5445	ON-OFF

AMP PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V3	AF Amp. -Phase Inverter	12AX7	
V4	Output	6V6GT	
V5	Output	6V6GT	
V6	Rectifier	6AX5GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	ANDREA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C21A	▲40	450	HCE-1345	AFH4-78-10	D0650	FP431.2	TMQ-99	Q-385	TVL-4736
B	■40	450							
C	▲10	450							
D	20	25							
C22	20	25	HCE-1347	PRS50V20	BBR20-25	TC26	TD-25-25	FM-0225	TVA-1205
C23	6	10VAC	HCE-1343	PRS10VAC8	[BR1215 BR1215 †	TC108		[MT-1512 MT-1512 †	R2235 *

† Connect negative leads together
* Non catalog item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	ANDREA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C24	.05	600	HCT-1012	BPD-05	DF-503	CUB6S5		GEM-615	6TM-S5	
C25	1500		HCC-1955	BPD-0015	DD-152	BYA10D15	ED-0015	DC5215	5HK-D15	
C26	.05	600	HCT-1012	BPD-05	DD-503	CUB6S5		GEM-615	6TM-S5	
C27	10000	1400	HCC-1963	P1688N-01		CUB16S1		GEM-1611	16TM-S1	

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ANDREA PART No.	IRC PART No.	
R27	1Meg		GRC-274	BTS-1Meg	
R28	470K		GRC-228	BTS-470K	
R29	470Ω		GRC-213	BTS-470	
R30	2200Ω		GRC-219	BTS-2200	
R31	220K		GRC-270	BTS-220K	
R32	470K		GRC-228	BTS-470K	
R33	1800Ω		GRC-346	BTS-1800	
R34	330K		GRC-301	BTS-330K	
R35	330K		GRC-301	BTS-330K	
R36	270Ω	5	GRW-553		
R37	47K		GRC-207	BTS-47K	
R38	3900Ω	1	GRC-351	BTA-3900	

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	ANDREA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .64A	660VCT @ .076A	6.3VCT① @ 3.3A		ST-3073 ② ST-3080 ③		P-2951 ④ P-2951 ④			

① Center tap not used
② 60 Cycle operation
③ 50 Cycle operation
④ Tape 5V, 2A winding & center tap on 6.3V winding

TRANSFORMER (AUDIO OUTPUT)

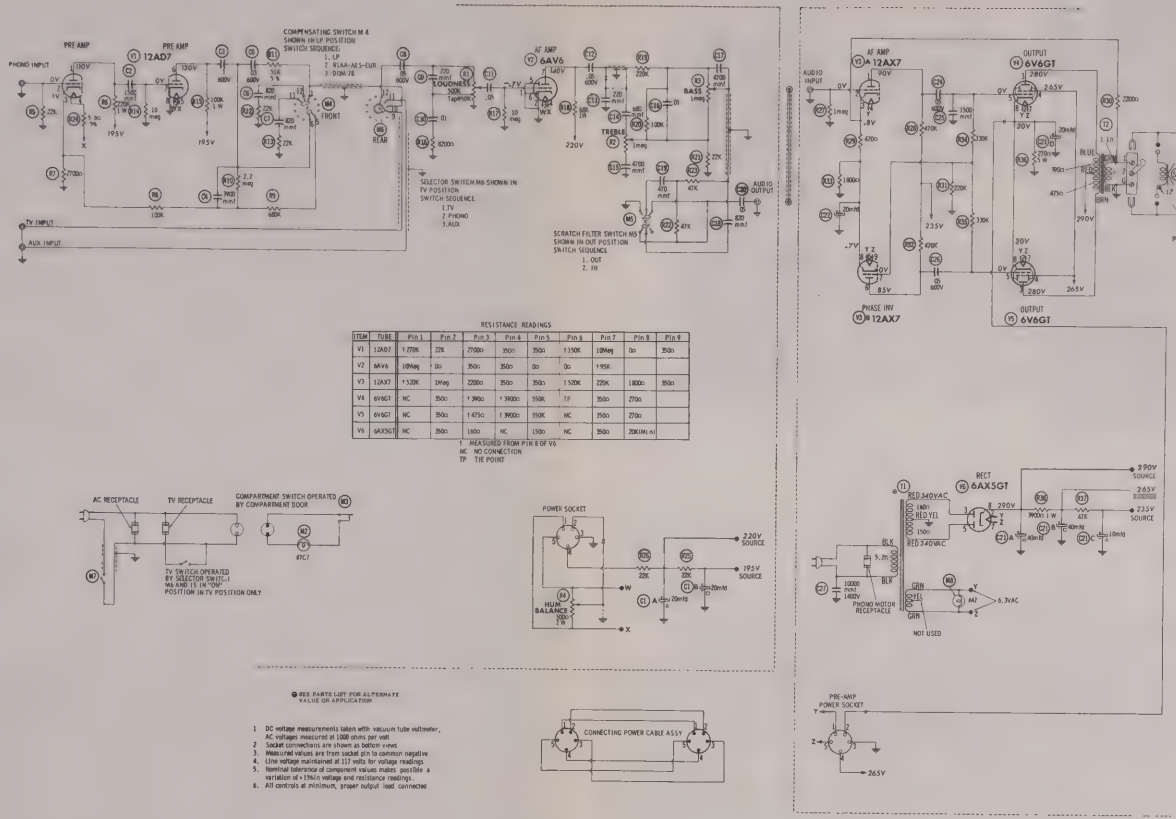
ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ANDREA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	6300Ω CT	3-4Ω	ST-3076	Z1002	A-2901	A-3823	24S61	S-55Z	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ANDREA PART No.	QUAM PART No.	
SP1	4"	PM	6-8Ω	SL-4032 ①	4A15TZ6.4 ①	① Parallel and Phase
SP2	4"	PM	6-8Ω	SL-4032 ①	4A15TZ6.4 ①	
SP3	12"	PM	6-8Ω	SL-4028 ①	12A10 ①	
SP4	12"	PM	6-8Ω	SL-4029 ①	12A10 ①	

MISCELLANEOUS

ITEM No.	PART NAME	ANDREA PART No.	NOTES
M8	Pilot Light		#47



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AD7	†270K	22K	270Ω	350Ω	350Ω	†150K	10Meg	0Ω	350Ω
V2	6AV6	10Meg	†0Ω	350Ω	350Ω	0Ω	0Ω	†95K		
V3	12AX7	†520K	1Meg	220Ω	350Ω	350Ω	†520K	220K	1800Ω	350Ω
V4	6V6GT	NC	350Ω	†390Ω	†390Ω	550K	TP	350Ω	270Ω	
V5	6V6GT	NC	350Ω	†475Ω	†390Ω	550K	NC	350Ω	270Ω	
V6	6AX5GT	NC	350Ω	180Ω	NC	150Ω	NC	350Ω	20K(MI n)	

† MEASURED FROM PIN 8 OF V6
NC NO CONNECTION
TP TIE POINT

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±10% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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PHOTOFACT* Folder

*TRADE MARK

RETMA MEMBER

FIRESTONE MODELS 13-G-211 thru 13-G-217 (Codes 199-6-21T58, 199-6-21T59, 280-6-21T49, 280-6-21T58, 280-6-21T59)

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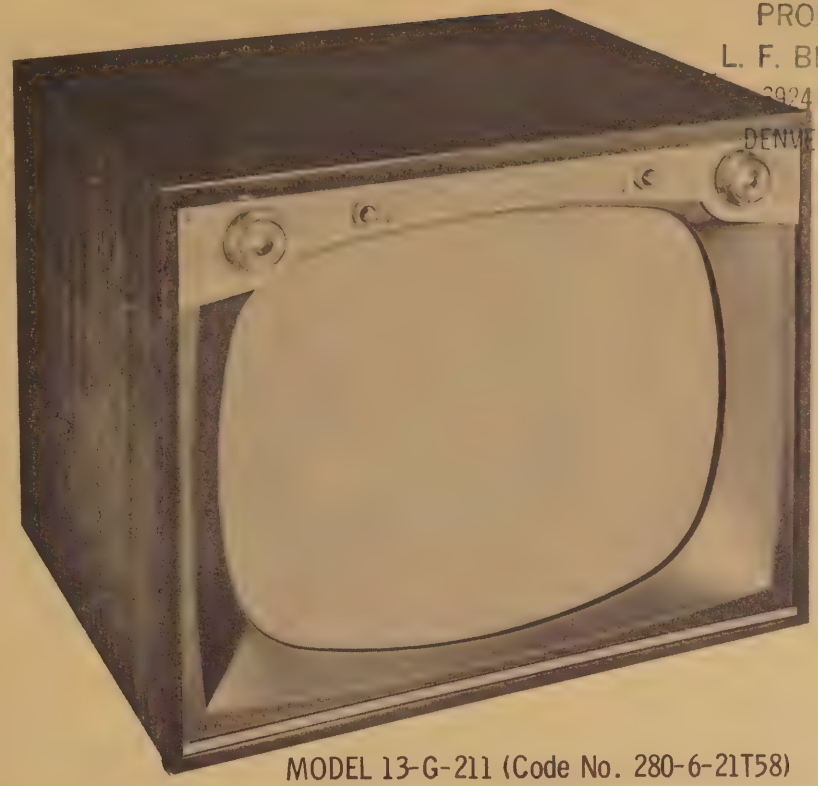

MODEL 13-G-211 (Code No. 280-6-21T58)

FIRESTONE MODELS 13-G-211 thru 13-G-217
(Codes 199-6-21T58, 199-6-21T59,
280-6-21T49, 280-6-21T58, 280-6-21T59)

TRADE NAME	Firestone	MODELS	CODE NUMBER
		13-G-216, 13-G-217	280-6-21T49
		13-G-211, 13-G-212, 13-G-214, 13-G-215	280-6-21T58
		13-G-213	280-6-21T59
SUPPLIER	Firestone Tire & Rubber Co., 1200 Firestone Parkway, Akron, Ohio		
TYPE SET	Television Receiver		
TUBES	Fifteen		
POWER SUPPLY	110-120 Volts AC, 60 Cycle	RATING 175 Watts, 1.5 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 46.75MC, Sound IF 42.25MC (Intercarrier)		

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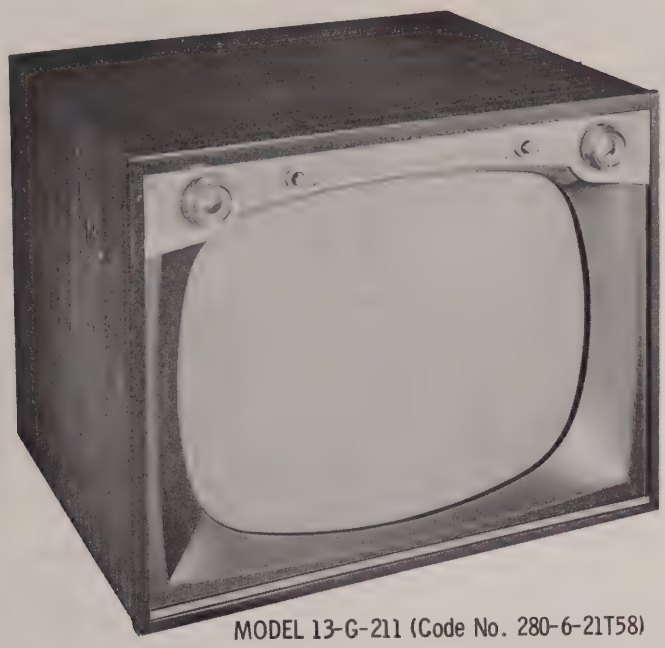
FIRESTONE MODELS 13-G-211 thru 13-G-217 (Codes 199-6-21T58, 199-6-21T59, 280-6-21T49, 280-6-21T58, 280-6-21T59)



MODEL 13-G-211 (Code No. 280-6-21T58)

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DENVER, COLORADO

FIRESTONE MODELS 13-G-211 thru 13-G-217 (Codes 199-6-21T58, 199-6-21T59, 280-6-21T49, 280-6-21T58, 280-6-21T59)

CAUTION NOTE

ONE SIDE OF AC LINE CONNECTED TO CHASSIS
Care should be exercised when connecting test equipment or physically contacting the chassis.

MODELS	CODE NUMBER
13-G-216, 13-G-217	280-6-21T49
13-G-211, 13-G-212, 13-G-214, 13-G-215	280-6-21T58
13-G-213	280-6-21T59

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF oscillator is possible by removing the channel selector and fine tuning knobs. Set the fine tuning at the center of its range. The adjustments are accessible, one at a time, as the channel selector is rotated. Adjust for best picture and sound.

PICTURE TUBE SAFETY GLASS CLEANING

1. Remove 7 push-on type control knobs from the front. NOTE: On power tuning models DO NOT attempt to remove on-off or channel buttons.
2. Remove 4 metal screws and the escutcheon.
3. Remove the metal screws and the safety glass clamps at the top.
4. Remove the safety glass.

FOCUS

The focus may be varied in steps by the position of a wire in the focus adjustment board. This requires a soldered connection. Readjust the Ion trap for the best focus consistent with maximum brightness.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to set. Set the horizontal hold at the center of its range and adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally. (For location see tube placement chart).

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate audio detector buzz, adjust the buzz control for MINIMUM buzz and maximum sound. (For location see tube placement chart).

FUSES

A circuit breaker is used for LV power supply protection. (For placement see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

ANTI-PIN CUSHION CORRECTION

Reduce the picture size so that the sides of the raster are visible. Position 2 magnets so that all sides are straight.

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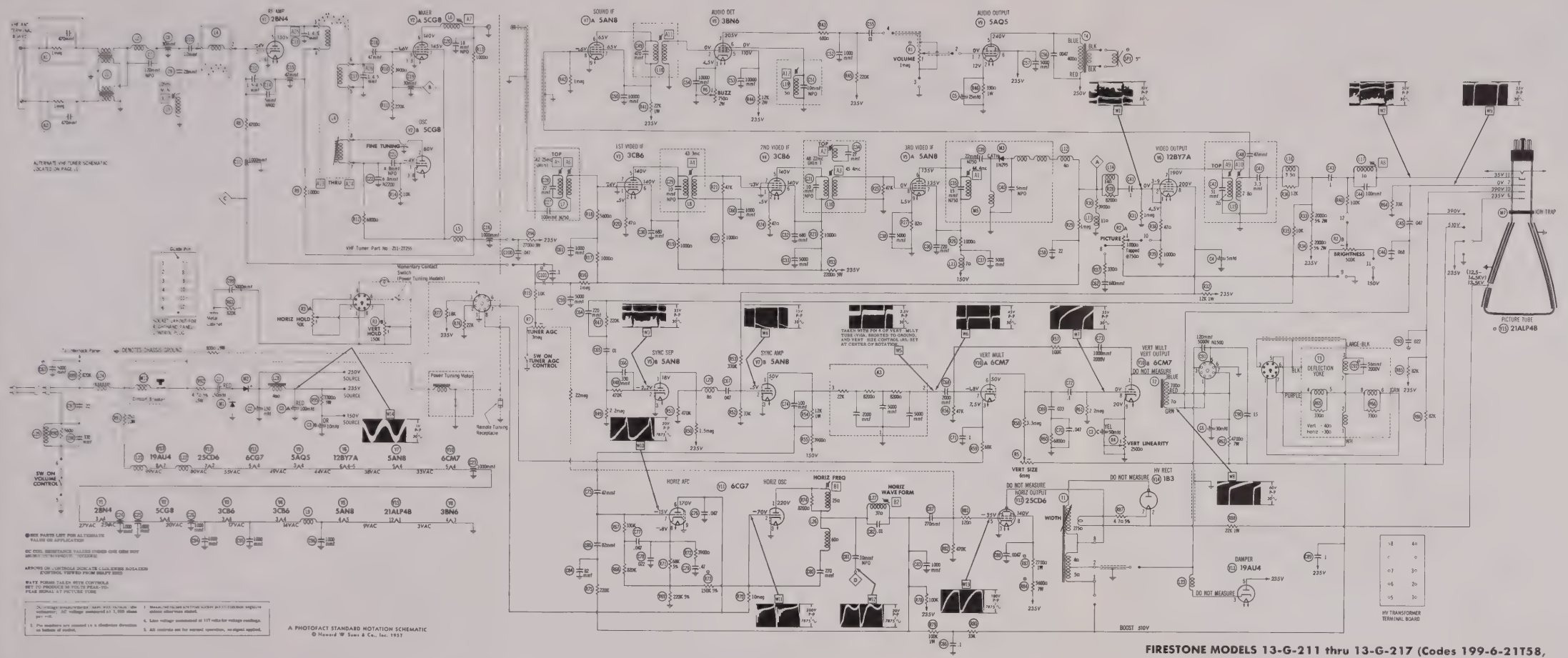

FIRESTONE MODELS 13-G-211 thru 13-G-217 (Codes 199-6-21T58, 199-6-21T59, 280-6-21T49, 280-6-21T58, 280-6-21T59)

TUBE PLACEMENT CHART

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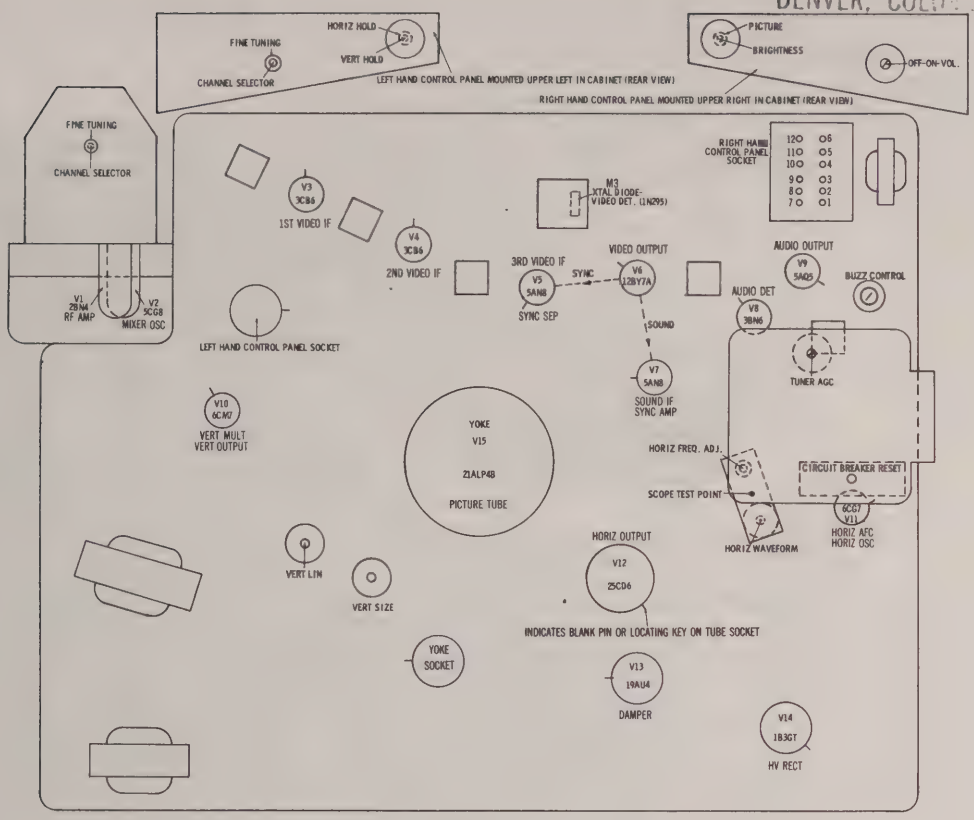


TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

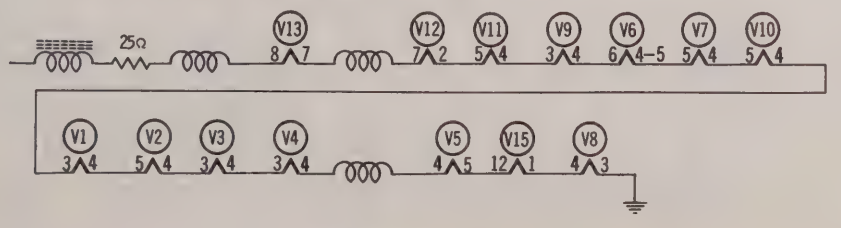
POWER SUPPLY FAILURE
No raster, no sound - Circuit Breaker (M10), Rectifier (M1, M2)

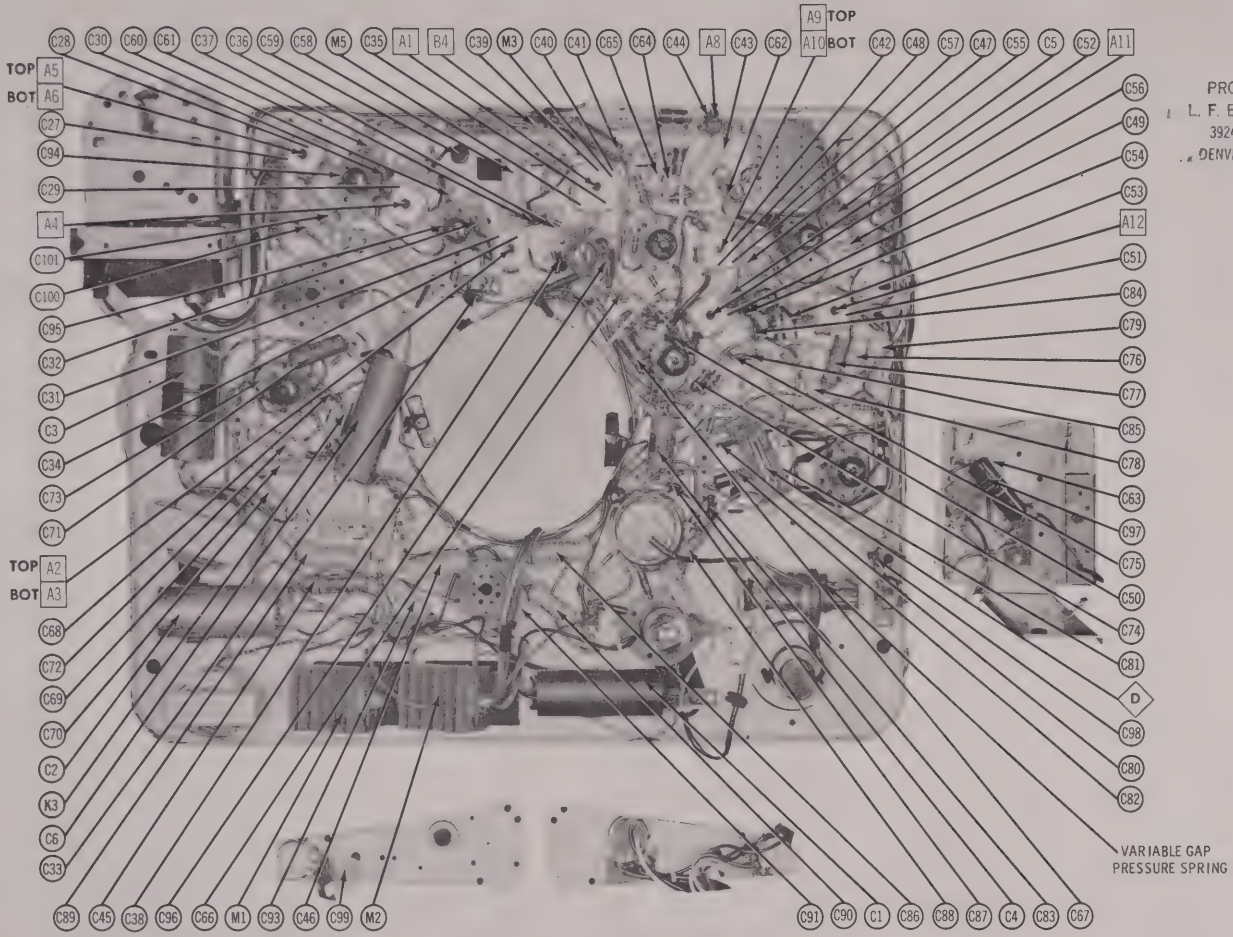
LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V3, V4, V5, Diode (M3), V6
No pic, no sound, has snow - V1, V2
No pic, has sound, has raster - V6, V15
Has pic, no sound - V7, V8, V9

SYNC FAILURE
No vert. sync - V5, V7
No horiz. sync - V5, V7, V11
No vert. or horiz. sync - V5, V7

SWEEP FAILURE
No raster, has sound - V11, V12, V13, V14, V15
No vertical deflection - V10
Poor vert. linearity or foldover - V10
Poor horiz. linearity or foldover - V11, V12, V13
Narrow picture - V11, V12, V13, M1, M2
Vert. off freq. - V10
Horiz. off freq. - V11

This receiver employs tubes used in a series filament network, an open filament in any tube in the series will cause the set to be inoperative. (See circuit below).





CAPACITOR AND ALIGNMENT IDENTIFICATION

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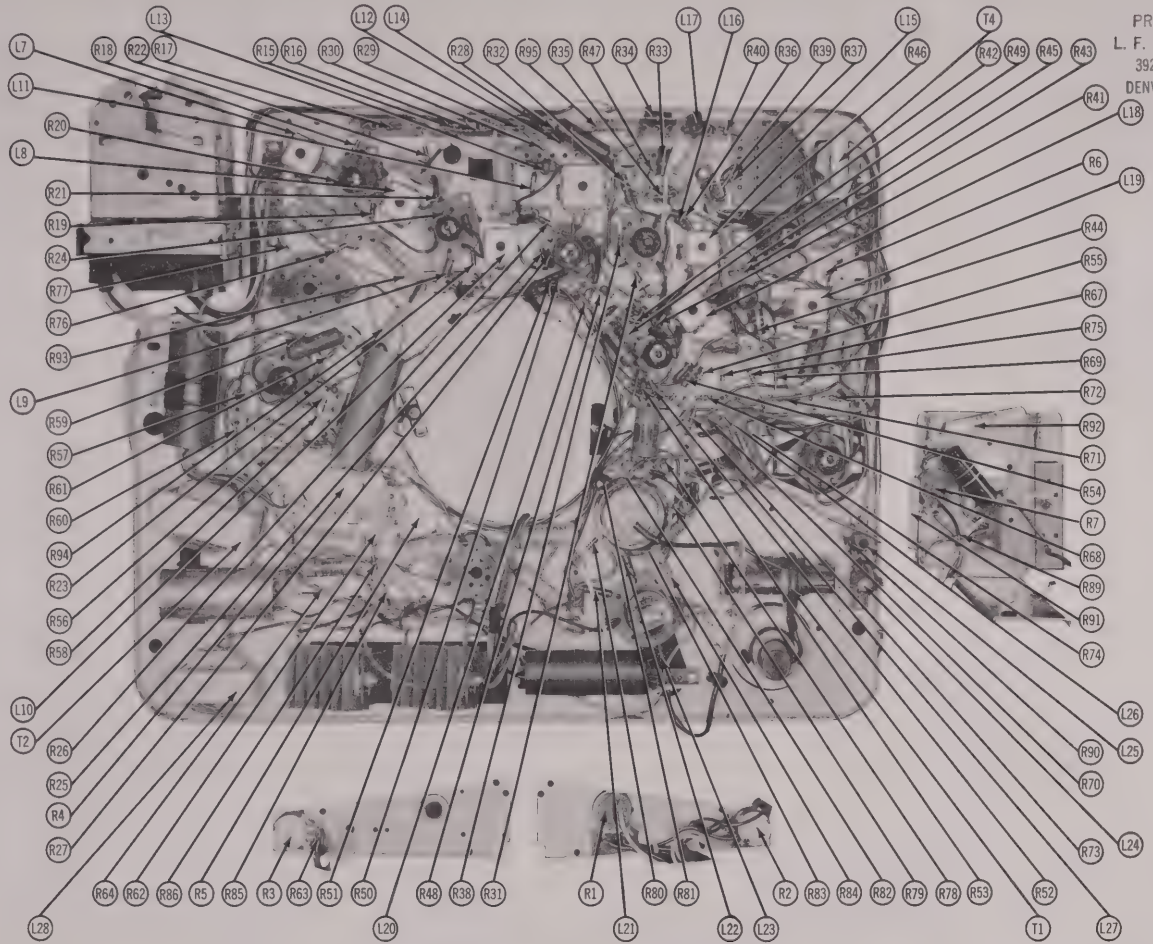

RESISTOR AND INDUCTOR IDENTIFICATION

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
The High Voltage lead should be securely taped and kept away from the chassis.

VIDEO IF ALIGNMENT

Connect a 1000MMF capacitor across the scope terminals.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	1000MMF	High side to pin 1 (grid) of 3CB6 (V3). Low side to chassis.	Not used	44.4MC (Unmod)	10	USE VTVM. DC probe to point (A). Common to chassis.	A1	Attenuate generator output to maintain not more than 2 volts at VTVM. Adjust for maximum deflection.
2.	"	"	"	48.22MC	"	"	A2	Adjust for MINIMUM deflection.
3.	"	"	"	45.4MC	"	"	A3	Attenuate generator output to maintain not more than 2 volts at VTVM. Adjust for maximum deflection. Repeat step 2.
4.	"	"	"	43.3MC	"	"	A4	Attenuate generator output to maintain not more than 2 volts at VTVM. Adjust for maximum deflection.
5.	"	"	44.0MC	43.65MC 46.75MC	"	Vert. Amp. thru 10K to point (A). Low side to chassis.		Adjust A1 for flat-top response.
6.	"	"	"	"	"	"		Check for response curve similar to Fig. 1 with markers at 40%. If curve is not correct, repeat steps 1 thru 3.
7.	"	High side to point (B). Low side to chassis.	Not used	42.25MC	"	USE VTVM. DC probe to point (A) Common to chassis.	A5	Use only enough generator output to provide usable indication on VTVM. Adjust for MINIMUM deflection.
8.	"	"	44.0MC	43.65MC 46.75MC	"	Vert. Amp. thru 10K to point (A). Low side to chassis.	A6, A7	Adjust for response similar to Fig. 2 with markers at 50%.

4.5MC TRAP ALIGNMENT

Tune in a TV station and adjust the fine tuning until sound bars just appear in the picture.
Adjust A8 fully counter clockwise, then clockwise until the horizontal scanning lines are smooth and continuous.

SOUND IF ALIGNMENT

Restore the receiver to normal operation. Tune in a TV station and adjust the fine tuning until sound bars just appear in the picture. Adjust A9 fully counter clockwise. Then clockwise until the horizontal scanning lines are smooth and continuous. Readjust the fine tuning for clearest picture and best sound. Insert an attenuator in series with the antenna and the receiver antenna terminals so that the signal strength may be varied from weak to strong. If a suitable attenuator is not available, stray feed the signal to the receiver by placing the antenna lead-in near the receiving antenna terminals. Reduce the signal input to the receiver so that the signal falls below the limiting level of the 3BN6 (V8) as evidenced by a hiss in the sound. Adjust A10, A11, A12 and the buzz control (R6) for maximum clear sound and MINIMUM buzz. If the hiss disappears during alignment, increase attenuation until the hiss reappears.

OSCILLATOR ALIGNMENT

Connect the negative lead of a 1.5 volt bias supply to point (C). Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the center of its range.
Use only enough sweep generator output to provide usable pattern on scope.
The channel oscillator adjustment slugs are reached thru a hole in the front of the tuner as the channel switch is turned to each channel.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC	13	Vert. Amp. thru 47K to point (A). Low side to chassis.	A13	Adjust to place video marker at 50% as in Fig. 3.
			207MC (10MC Swp)	205.25MC	12		A14	
			201MC (10MC Swp)	199.25MC	11		A15	
			195MC (10MC Swp)	193.25MC	10		A16	
			189MC (10MC Swp)	187.25MC	9		A17	
			183MC (10MC Swp)	181.25MC	8		A18	
			177MC (10MC Swp)	175.25MC	7		A19	
			85MC (10MC Swp)	83.25MC	6		A20	
			79MC (10MC Swp)	77.25MC	5		A21	
			69MC (10MC Swp)	67.25MC	4		A22	
			63MC (10MC Swp)	61.25MC	3		A23	
			57MC (10MC Swp)	55.25MC	2		A24	

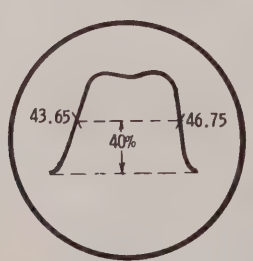

FIG. 1

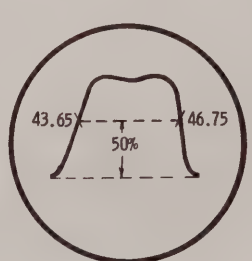

FIG. 2

ALIGNMENT INSTRUCTIONS (cont)

RF AND MIXER ALIGNMENT FOR TUNER #211-27255

Connect bias as under "Oscillator Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC (10MC Swp)	193.25MC 197.75MC	10	Vert. Amp. thru 10K to point Ⓑ. Low side to chassis.	A25, A26	Adjust A25 and A26 for response similar to Fig. 4 with markers on shoulders of curve.
11.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response similar to Fig. 4. If markers fall below 70% on any channel, make compromise adjustment of A25, and A26 with channel switch set to that channel. Check all other channels to see that they have not been seriously affected.
			207MC (10MC Swp)	205.25MC 209.75MC	12			
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			
12.	"	"	Not used	105.0MC	2	USE VTVM. DC probe to point Ⓐ. Common to chassis.	A27	Adjust for MINIMUM deflection.

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DENVER, COLORADO

RF AND MIXER ALIGNMENT FOR TUNER #211-27057

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 10K to point Ⓑ. Low side to chassis.	A28, A29, A30	Adjust for response curve similar to Fig. 4 with markers above 90%.
14.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response similar to Fig. 4. If markers fall below 70% on any channel, make compromise adjustments of A28, A29 and A30 with channel switch set to that channel. Check all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

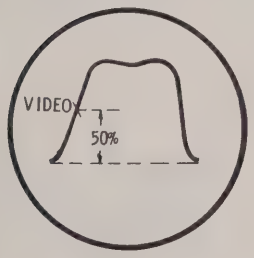

FIG. 3

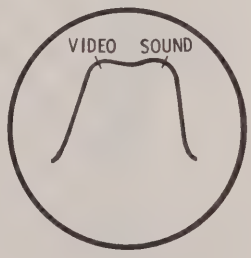

FIG. 4

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	2BN4	0Ω	2Meg	9Ω	8Ω	†3700Ω	0Ω	2Meg		
V2	5CG8	10K	†9500Ω	0Ω	6Ω	8Ω	†3700Ω	†2700Ω	0Ω	224K
V3	3CB6	1Meg	47Ω	6Ω	5Ω	†3200Ω	†3200Ω	0Ω		
V4	3CB6	1Meg	47Ω	5Ω	4Ω	†3200Ω	†3200Ω	0Ω		
V5	5AN8	330K	2.6Meg	0Ω	4Ω	2.5Ω	†4300Ω	†4300Ω	.1Ω	82Ω
V6	12BY7A	• 270Ω	1Meg	•270Ω	13Ω	13Ω	14Ω	†4000Ω	†12K	•270Ω
V7	5AN8	†19K	30K	0Ω	11Ω	13Ω	†22K	†22K	1Meg	0Ω
V8	3BN6	•450Ω	.3Ω	0Ω	1Ω	†12K	5Ω	†220K		
V9	5AQ5	•50Ω	330Ω	15.5Ω	14Ω	†400Ω	†46Ω	• 50Ω		
V10	6CM7	ǂ5400Ω	TP	•170K	9Ω	11Ω	ǂ• 3.8Meg	47K	2.2Meg	• 1100Ω
V11	6CG7	†100K	340K	0Ω	15.5Ω	17Ω	†• 22K	1.4Meg	280K	0Ω
V12	25CD6GA	TP	17Ω	0Ω	NC	470K	NC	25Ω	†8300Ω	TOP CAP ǂ 5Ω
V13	19AU4	TP	NC	¶	TP	†46Ω	NC	25Ω	30Ω	
V14	1B3GT		PINS	1 THRU 8	HAVE	INFINITE	RESISTANCE			TOP CAP ǂ 280Ω
V15	21ALP4B	1Ω	33K	PIN 6 †46Ω	PIN 10 ǂ50K	PIN 11 •180K	PIN 12 2.5Ω			

NC NO CONNECTION
TP TIE POINT
† MEASURED FROM OUTPUT OF M2.
• THIS READING WILL VARY, CONTROL SET FOR NORMAL OPERATION.
ǂ MEASURED FROM PIN 3 OF V13.
¶ THIS READING CAN VARY GREATLY, (10K MINIMUM), DUE TO THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 7 push-on type control knobs from the front. NOTE: On power tuning models, DO NOT attempt to remove the on-off or channel selector buttons. On these models remove the 4 metal screws, the escutcheon, and remove the channel indicator disc and the fine tuning drive.

2. Lay receiver face down on a soft pad .

3. Remove 6 spring clips, 2 metal screws and the rear cover.

4. Remove speaker leads, picture tube socket, HV lead, yoke plug and 2 control plugs.

5. Remove 2 metal screws from the tuner bracket.

6. Remove 1 metal screw holding the top chassis brace.

7. Remove 4 metal screws holding the chassis.

8. Remove the chassis.

9. Set the cabinet upright.

10. Remove 4 metal screws and the escutcheon from the front.

11. Remove the 4 metal screws holding the 2 control panels, and remove the panels.

12. Remove 2 speaker nuts and the speaker.

ALTERNATE VHF TUNER SCHEMATIC
VHF Tuner Part No. 211-27057
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3924 MEADE ST.
DENVER, COLORADO
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1957
VHF ANT. TERMINAL BOARD
680K
47mmf
8.2 mmf
Tuning Slug Used On Channels 2 Thru 6 Only.
RF AMP 4BQ7A
MIXER A 5BR8
OSC B 5BR8
FINE TUNING
4BQ7A
5BR8
THRU
(IF OUTPUT) To C27
33mmf
15K
33K
1000mmf
680Ω
220K
10K
10mmf
5mmf
4700Ω
60mmf
.5mmf
.5-3mmf
3-8mmf
3.9mmf
47K
800mmf
5600Ω
150V
235V
(RF AGC) To Junction Of R15, R16 & C59.
To Pin 4 OF V10.
To Pin 3 Of V3
A7
A13
A24
A28
A29
A30
B
C

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	RF Amplifier	3BN4	
V2	Mixer Oscillator	5CG8	
V3	1st Video IF Amp	3CB6	
V4	2nd Video IF Amp	2CB6	
V5	3rd Video IF Amp - Sync Separator	5AN8	
V6	Video Output	12BY7A	
V7	Sound IF Amp - Sync Amp	5AN8	

ITEM No	USE	TYPE	NOTES
V8	Audio Detector	3BN6	
V9	Audio Output	5AQ8	
V10	Vert. Mult. Vert Output	6CM7	
V11	Horiz. AFC-Horiz Osc.	6CG7	
V12	Horiz. Output	6DQ6	
V13	Damper	19AU4	
V14	HV Rectifier	1B3GT	

PICTURE TUBE

ITEM No	REPLACEMENT DATA			NOTES
	FIRESTONE PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	
V15	21ALP40	21ALP4B 21ALP4A 21ALP4D 1 21ALP4 21ALP4A 2 21ATP4 21ATP4A 21ATP4 1 21ATP4A 2	21ALP4B 21ALP4A 21ALP4D 1 21ALP4 21ALP4A 2 21ATP4 21ATP4A 21ATP4 1 21ATP4A 2	1 Aluminized 2 Silver screen "85"
	24DP4A	24DP4A 1 24DP4	24DP4A 1 24DP4 2	

ELECTROLYTIC CAPACITORS

ITEM No	RATING		REPLACEMENT DATA						
	CAP	VOLT	FIRESTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	150	150	8C-3715T	PRI-100	XAD351	TC495	TD-150-150	MT-15150	TVA-1422
C2	150	300	8C-3711A	AFIBU-ST-35		FP131	TM3-45	S-200	TVL-1584
C3A	100	300	8C-2709	PRI-053	BR505	WQ-025		T-537	R2227 *
B	10	300			CD0040			MT-0255	
C	50	50							
C4	5	300	8C-3417A-1	PRS350V4	BR435	TC40	TD-5-350	FM-350V	TVA-1401
C5	25	25	8C-3711E	PRS25V25	BR525	TC36	TD-25-25	FM-025	TVA-1405
C6	30	450	8C-3707B	PRS450V30	BR3045	TC47	TD-30-450	FM-4530	TVA-1711

* Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP	VOLT	FIRESTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C7	120		31-LB40BLK	NPO-SI 120	TCZ-120	CD7C1C	TCC-120		5TCC-T12	NPO
C8	30		13M-320EA300J-05							
C9	33		13R-005							
C10	13		13R-003							
C11	1000		13A3305EA102Z-04	EF-001	MPT-1000				502C-D1	
C12	1.5-4.5		31B-902-07		529-E		532-B			
C13	1.0-4.5		31B-902-07		529-E		532-B			
C14	6		13L5GP050M		529-E		532-B			N900
C15	47		13M130U47DJ							
C16	1000		31T-3184	EF-001	MPT-1000				502C-D1	
C17	1.0-4.5		31B-902-07		529-E		532-B			
C18	47		13R-001							
C19	330		13M-330EA300M-06							
C20	18		13L0C180J		TCZ-18	C10C8C	TCC-18			NP0
C21	8.8		13R-006		TCZ-8R8	C10Y8C	TCC-8.8	2T-5568	5TCCB-V8	
C22	2.8		13R-007							N2200
C23	1000		108E-27602	EF-001	MPT-1000				502C-D1	
C24	1000		108E-27602	EF-001	MPT-1000				502C-D1	
C25	1000		108E-27602	EF-001	MPT-1000				502C-D1	
C26	1000		108E-27602	EF-001	MPT-1000				502C-D1	
C27	150		8C-3715T-R1 100	TCM-150		C10TIU	TCT-100	NT-531	5TCU-T1	N750
C28	37			TCZ-37			ED-37	UC-5427		
C29	10			NPO-SI 10		TCZ-10	D10C1C	TCC-10	5TCC-CJ	NP0
C30	15			SI 680		D6-S81	BYA10788	ED-680	UC-5358	5GA-T68
C31	10			NPO-SI 10		TCZ-10	C10G1C	TCC-10	5TCC-CJ	NP0
C32	680			SI 680		D6-S81	BYA10788	ED-680	UC-5358	5GA-T68
C33	5000			BPD-005		DD-502	BYA10D6	ED-005	DC525	5HK-D6
C34	37					TCZ-37	D10Q1T	ED-37	UC-5427	
C35	15			N750-SI 15		TCM-15	C10Q5U	TCT-15		5TCU-Q5 N750
C36	120			N750-SI 120		LD7Z1	LU7Z1	ED-120	UC-5323	5GA-T12 ①
C37	5000			BPD-005		DD-502	BYA10D6	ED-005	DC525	5HK-D6
C38	5000			BPD-005		DD-502	BYA10D6	ED-005	DC525	5HK-D6
C39	33			N750-SI 33		TCM-33	C10Q3U	TCT-33	5TCU-Q33	N750
C40	5			NPO-SI 5		TCZ-5	C10Y5C	TCC-5	2T-555	5TCCB-V4 NP0
C41	5	300		P388N-1		DF-104	D2S3F5		GEM-301	3TM-P1
C42	81			NPO-SI 80		TCZ-81	L10Q5U	ED-81		
C43	1.1	400		P488N-1		DF-104	CU84P1		GEM-401	4TM-P1
C44	100			BPD-0001		DD-101	LU7Z1	ED-100	UC-531	5GA-T1
C45	.047	600		BPD-05		DF-503	CU8S647		GEM-6147	6TM-S47
C46	.068	600		P68N-668		DF-503	CU8S668		GEM-6168	6TM-S68
C47	3.3			NPO-SI 3.3		TCZ-3R3	C10V3C	TCC-3.3	2T-5533	5TCCB-V33
C48	5000			BPD-0000047		DD-470	LU0Q47	ED-470	UC-5447	5TCC-Q47
C49	470			BPD-0047		DD-471	BYA10T47	ED-470	UC-5347	5GA-T47
C50	10000			BPD-01		DD-103	BYA501	ED-01	DC511	5HK-S1
C51	10			NPO-SI 10		TCZ-10	C10Q1C	TCC-10	2T-542	5TCC-CJ NP0
C52	1000			BPD-001		DD-102	BYA5D1	ED-001	DC52	5HK-D1
C53	1000			BPD-001		DD-102	BYA501	ED-001	DC511	5HK-S1
C54	10000			BPD-01		DD-103	BYA501	ED-01	DC511	5HK-S1
C55	.01	400		BPD-001		DD-102	CU84S1	ED-01	GEM-411	4TM-S1
C56	.0047	600		BPD-0047		DF-473	CU8D47	ED-0047	GEM-6247	6TM-D47
C57	5000			BPD-005		DD-502	BYA10D6	ED-005	DC525	5HK-D6
C58	.33	300		P388N-33			CU83F33		GEM-3032	4TM-P32
C59	5000			BPD-005		DD-502	BYA10D6	ED-005	DC525	5HK-D6
C60	1000			BPD-001		DD-103	BYA5D1	ED-001	DC52	5HK-D1
C61	1000			BPD-001		DD-103	BYA501	ED-001	DC521	5HK-D1
C62	680			SI 680		D6-S81	BYA10788	ED-680	UC-5388	5GA-T68
C63	5000			BPD-005		DD-502	BYA10D6	ED-005	DC525	5HK-D6 ②
C64	220			BPD-00022		DD-221	LU7Y22	ED-220	UC-5323	5GA-T22
C65	1000			BPD-01		DD-103	CU84S1	ED-01	GEM-411	4TM-S1
C66	330			SI 330		D6-331	LU7Y33	ED-330	UC-5323	5GA-T33
C67	.047	300		BPD-05		DF-503	CU82S47		GEM-3147	3TM-S47
C68	3000			SI 3000		D6-302	BYA10D2	ED-002	DC522	5HK-D2
C69	.033	400		BPD-03		DF-333	CU84S3		GEM-4133	4TM-S33
C70	.047	300		BPD-05		DF-503	CU82S47		GEM-3147	3TM-S47

CAPACITORS (cont)

ITEM No	RATING		REPLACEMENT DATA							NOTES
	CAP	VOLT	FIRESTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C71	1	200		P288N-1		DF-104	CU82P1		GEM-301	3TM-P1
C72	1	400		P488N-1		DF-104	CU84P1		GEM-401	4TM-P1
C73	1000	4000		HVD-10-4000		DD-102	HVS502		DC501	5GA-D1
C74	100			SI 100		D6-101	LU7T	ED-100	UC-531	5GA-T1
C75	47			BPD-000047		DD-470	LU0Q47	ED-47	UC-5447	5GA-Q47
C76	.047	400		BPD-05		DF-503	CU84S47		GEM-4147	4TM-S47
C77	.047	400		BPD-05		DF-503	CU83S47		GEM-3147	3TM-S47
C78	.022	400		BPD-03		DF-303	CU83S22	ED-02	GEM-3122	3TM-S22
C79	.47	400		P288N-47			CU82P47		GEM-3047	3TM-P47
C80	270			BPD-00027		DD-271	LU7Z7	ED-270	UC-5327	5GA-T27
C81	10			NPO-SI 10		TCZ-10	C10Q1C	ED-10	2T-542	5TCC-CJ NP0
C82	91	600		BPD-01		DD-103	CU8S91	ED-01	GEM-611	6TM-S1
C83	1000			BPD-001		DD-102	BYA5D1	ED-001	DC521	5HK-D1
C84	82			SI 82		D6-S80	LU0Q82	ED-82	UC-5483	5GA-Q82
C85	82			SI 82		D6-S80	LU0Q82	ED-82	UC-5483	5GA-Q82
C86	1	600		P68N-1		DF-104	CU86P1		GEM-601	6TM-P1
C87	270			SI 270		DD-271	LU7Z7	ED-270	UC-5327	5GA-T27
C88	47	600		BPD-0047		D6-472	CU8D47	ED-0047	GEM-6247	6TM-D47
C89	.1	600		P68N-1		DF-104	CU86P1		GEM-601	6TM-P1
C90	18	500		P58N-18			CU85P18		GEM-3015	3TM-P18
C91	190	5000	8C-3523S							M500 ①
C92	68	3000				DD80-568	HVA20G68		DC9068	30GA-G68 ①
C93	.022	600		BPD-03		DF-303	CU8S822	ED-03	GEM-6122	6TM-S22
C94	1000			BPD-001		DD-102	BYA5D1	ED-001	DC521	5HK-D1
C95	1000			BPD-001		DD-102	BYA5D1	ED-001	DC521	5HK-D1
C96	1000			BPD-001		DD-102	BYA5D1	ED-001	DC521	5HK-D1
C97	.22	400		P488N-22			CU84P22		GEM-4022	4TM-P22
C98	330			BPD-00033		DD-331	LU7Z33	ED-330	UC-5333	5GA-T33
C99	5000			BPD-005		DD-502	BYA10D6	ED-005	DC525	5HK-D6
C100	.047	400		BPD-05		DF-503	CU84S47		GEM-4147	4TM-S47
C101	.1	200		P288N-1		DF-104	CU82P1		GEM-301	3TM-P1 ③

1 Some versions may use a 680MMF in this application.
2 Some versions may use a .1MFD @ 200V in this application.
3 Some versions may use a 68MMF @ 5KV (Part #47B96) in this application.
4 Some versions may use a 68MMF @ 5KV in this application.
5 Not used in some versions.

CONTROLS

ITEM No	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESIST ANCE	WATTS	FIRESTONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1Meg	1	10A-25816	B-50	A47-1Meg-Z	Q3-157	U53	Volume - Note 1
B	Shaft			Not Req.	KSH-3	Not Req.	Not Req.	
C	Switch			KS-1	SWE-13		U5-26	Picture - tap @ 750Ω
R2A	500K	1	10B-28828		RTV-515		UE80	Brightness
B	500K				Not Req.		Not Req.	Horiz. Hold
R3A	50K	1	10B-28826	F1-29	A47-50K		UE-979	Vert. Hold
B	150K			R2-33	Not Req.		Not Req.	Vert. Linearity
R4A	2500Ω	1	10B-27707	A3-7	A47-2500-S	B11-111	U7	
B	Shaft			AK-1	FIGH-1/4	TM1-KH	Not Req.	
R5A	5Meg	1	10B-27708	A3-89		Q1-163		Vert. Size
B	Shaft			AK-1		Not Req.		
R6	750Ω	2	10D-28857-1	B-94	39-800		FL-750	Buzz - wire wound
R7A	3Meg	1	10A-28567	Not Req.	A47-3Meg-S	Q1-140	U59	Tuner AGC
B	Shaft			KSH-1	KSH-3	Not Req.	Not Req.	
C	Switch			KS-1	SWE-13	TS-1	U5-26	

Note 1. Used in Models TV1-9404A, TV1-9408A, TV1-9407A. Alternate part #10B-28817 with no switch attached used in Models TV1-9408A, TV1-9409A, TV1-9410A, TV1-9411A.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	FIRESTONE PART No.	IRC PART No.	
R8	4700Ω			BTS-4700	
R9	1000Ω			BTS-1000	
R10	3900Ω			BTS-3900	
R11	330K			BTS-330K	
R12	68000			BTS-68K	
R13	1000Ω			BTS-1000	
R14	10K			BTS-10K	
R15	10K				
R16	1Meg				
R17	1000Ω				
R18	5600Ω				
R19	1000Ω			BTS-1000	
R20	47Ω			BTS-47	
R21	47K			BTS-47K	
R22	1000Ω				
R23	1000Ω			BTS-1000	
R24	47Ω			BTS-47	
R25	47K			BTS-47K	
R26	1000Ω			BTS-1000	
R27	82Ω			BTS-82	Note 1
R28	8200Ω				
R29	1Meg				
R30	5900Ω			BTS-1Meg	
R31	1Meg			BTS-1M	
R32	12K	1			
R33	3000Ω	5% 2			
R34	3000Ω	5% 2			
R35	10K			BTS-10K	
R36	12K			BTS-12K	
R37	3300Ω			BTS-330	
R38	47Ω			BTS-47	
R39	1000Ω			BTS-1000	
R40	100K			BTS-100K	
R41	22K	1		BTS-22K	
R42	1Meg			BTS-1Meg	
R43	680Ω			BTS-680	
R44	12K	2		BTS-11K	
R45	330K			BTS-330K	
R46	3300Ω	1		BTA-330	
R47	220K			BTS-220K	
R48	470K			BTS-470K	
R49	2.2Meg			BTS-2.2Meg	
R50	1.5Meg			BTS-1.5Meg	
R51	470K			BTS-470K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	FIRESTONE PART No.	IRC PART No.	
R52	33K			BTS-33K	
R53	330K			BTS-330K	
R54	15K	1		BTA-15K	
R55	3900Ω			BTS-3900	
R56	47K			BTS-47K	
R57	100K			BTS-100K	
R58	820K			BTS-820K	
R59	330K 5%			BTS-330K	
R70	10Meg			BTS-10M	
R71	68K 5%			BTS-68K	
R72	3900Ω				
R73	150K 5%			BTS-150K	Note 2
R74	8200Ω			BTS-8200	
R75	220K				
R76	22K			BTS-22K	
R77	18K			BTS-18K	
R78	100K			BTS-100K	
R79	100K	1		BTA-100K	
R80	33K			BTS-33K	
R81	10M			BTS-10M	
R82	470K			BTS-470K	
R83	27000	1	9C1-1071	BTS-27K	Note 2
R84	5600Ω	7			
R85	82K			BTS-82K	
R86	8200Ω		8C12-1108	BTS-82K	
R87	4.7Ω 5%			BW1-4.7 5%	
R88	22K	1		BTS-22K	
R89	820K			BTS-820K	
R90	5600			BTS-560	
R91	25Ω	10	9C14-1117	PW10-25	
R92	4.7Ω 5%	10	9C13-1194		
R93	2200Ω	5			
R94	27000	3	9C14-1004		
R95	12000	5	9C12-1106	PW7-3300	

Note 1. Some versions may use a 150Ω in this application.
Note 2. Some versions may use a 120K in this application.
Note 3. In some versions R83 and R84 may be a single 32000Ω, TW resistor.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA						NOTES
		FIRESTONE PART No.	Haldorson PART No.	Merit PART No.	RCA TYPE No.	Rom PART No.	Stancor PART No.	Thordarson PART No.	Tried PART No.	
T1	Horiz. Output Trans.	13E-27097	FH84L 1 *f				A-8293 1	FLY-94	D-83 1 *	
T2	Vert. Output Trans.	13E-27186	21804 2	A-3037 2	22AT1 2	V312 2	VO-101	26352 2	A-102X 2	
T2A	Yoke(90°)Horiz. (18.5MHz)	301-27120 ③	DF607 ①	MDF-92 ①	225G1 ①	Y90719.43 ①	DY-18A ①	Y-16 ①	Y-41 & BW1	
B	Vert. (15MHz)	16M-13770 4 40M-27184 ③							YCI 4 CLI 5	

① Use original variable gap pressure spring.
② Drill new mounting hole(s).
③ Includes rear cover and centering device.
④ Rear cover and centering device.
⑤ Yoke clamp.
⑥ Use original yoke damping network.
⑦ Use original rear cover and centering device.
* This part may be superceded by Parts Manufacturer's introduction of special unit for this application.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Haldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Rom Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Tried Replacement Connections
8	8			8	8	8	8
7	7			7	7	7	7
1	1	1	1	1	1	1	1

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	FIRESTONE PART No.	Haldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Tried PART No.	
T4	7700Ω	3-4Ω	13C-27704-2	21115 1	A-2931 1	A-8114 1	24854 1	S-8X	1 Drill one new mounting hole.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	FIRESTONE PART No.	QUAM PART No.	
SP1	5"	PM	3-4Ω	18A-25825-1①	SA07	① Used in Models 13-G-211, 13-G-212, 13-G-215
	6"	PM	3-4Ω	18A-25937-1②	6AL	② Used in Models 13-G-214, 13-G-218
	8"	PM	3-4Ω	18A-27435 ③		③ Used in Models 13-G-216, 13-G-217

COILS (RF-IF)

ITEM No.	USE	FIRESTONE PART No.	NOTES
L1	Ant. Trans.	108E-27617	
L3	Parallel Trap	108E-27612	
L3	Series Trap	108E-27613	
L4A	Ant. RF, Mixer Grid, Osc. Coils	108E-27614-2	Channel 2
B	Ant., RF, Mixer Grid, Osc. Coils	108E-27614-3	Channel 3
C	Ant., RF, Mixer Grid, Osc. Coils	108E-27614-4	Channel 4
D	Ant., RF, Mixer Grid, Osc. Coils	108E-27614-5	Channel 5
E	Ant., RF, Mixer Grid, Osc. Coils	108E-27614-6	Channel 6
F	Ant., RF, Mixer Grid, Osc. Coils	108E-27614-7	Channel 7

ITEM No.	USE	FIRESTONE PART No.	NOTES
G	Ant., RF, Mixer Grid, Osc. Coils	108E-27614-8	Channel 8
H	Ant., RF, Mixer Grid, Osc. Coils	108E-27614-9	Channel 9
I	Ant., RF, Mixer Grid, Osc. Coils	108E-27614-10	Channel 10
J	Ant., RF, Mixer Grid, Osc. Coils	108E-27614-11	Channel 11
K	Ant., RF, Mixer Grid, Osc. Coils	108E-27614-12	Channel 12
L	Ant., RF, Mixer Grid, Osc. Coils	108E-27614-13	Channel 13
L5	RF Choke	108E-27616	
L6	Mixer Plate Coil	108E-27615	

ITEM No.	USE	REPLACEMENT DATA			NOTES
		FIRESTONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L7	1st. Video IF	13A-26998				Includes 43.25MC Trap
L8	2nd. Video IF	13A-25994			6504	1.4 Microhenries
L9	Fil. Choke	18A-26985	19-1001			Includes 45.25MC Trap
L10	Det. Video IF	13A-26995				8 Microhenries, 3MC
L11	Resonant Choke	18A-26987				13 Microhenries - 68MC
L12	Resonant Choke	18A-26986				260 Microhenries
L13	Shunt Peaking Coil	18A-27203	19-3260	TV-185	6181	640 Microhenries
L14	Series Peaking Coil	18A-27467			6138	
L26A	4.5MC Trap	13M-26979				
B	Ist. Sound IF					60 Microhenries
L16	Series Peaking Coil	18A-27468	19-3076		6173	
L17	4.5MC Trap	18A-26991		TV-191		
L18	Snd. Sound IF	201-23713-1				
L19	Quadrature Coil	13M-26988		TV-194		
L20	Resonant Choke	18A-26987				8 Microhenries, 3MC
L21	RF Choke	18A-26530	19-1004		6510	8 Microhenries
L22	RF Choke	18A-26520	19-1004		6510	6 Microhenries
L23	RF Choke	18A-26530	19-1004		6510	8 Microhenries
L24	Line Choke	13M-27404				47 Microhenries
L25	Line Choke	13M-27405				4 Microhenries

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES		REPLACEMENT DATA						NOTES
	PRI.	SEC.	FIRESTONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Rom PART No.	Thordarson PART No.	
L36	85Ω		13E-26993							Tapped @ 60Ω Horiz. Freq.
L37	37Ω		13M-26992							Horiz. Waveform

PARTS LIST AND DESCRIPTIONS (Continued)

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	FIRESTONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L28	.300A	46Ω	1.5 HY	16B-25146-3	C5037 ①	C-2996 ①	C-2326 ①	26C44	C-17X ①

① Drill one new mounting hole.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	FIRESTONE PART No.	REPLACEMENT DATA
K1	Ant. Input	470MMF, 1Meg		
K2	Ant. Input	470MMF, 1Meg		
K3	Vert. Integrator	2000MMF, 5000MMF, 5000MMF, 22K, 8200Ω, 8200Ω	17A-27087	Aerovox PA-110 Centralab PC-100 Cornell-Dubilier 115TM1 Erie 1405-01 Sprague V-1

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT (Measured)	FIRESTONE PART No.	FEDERAL PART No.	GENERAL ELECTRIC PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	
M1	.335A	2LJ25315 ①	1241A ①	1N1007 ②	MR350 ①	6S450 ①	350A ①	
M2	.335A	2LJ25315 ①	1241A ①	1N1007 ②	MR350 ①	6S450 ①	350A ①	

① Selenium Type. ② Germanium type.

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		FIRESTONE PART No.	SYLVANIA PART No.	
M3	1N295 *		1N60	Video Detector (Pigtail)

* A CK706A may be used in some versions.

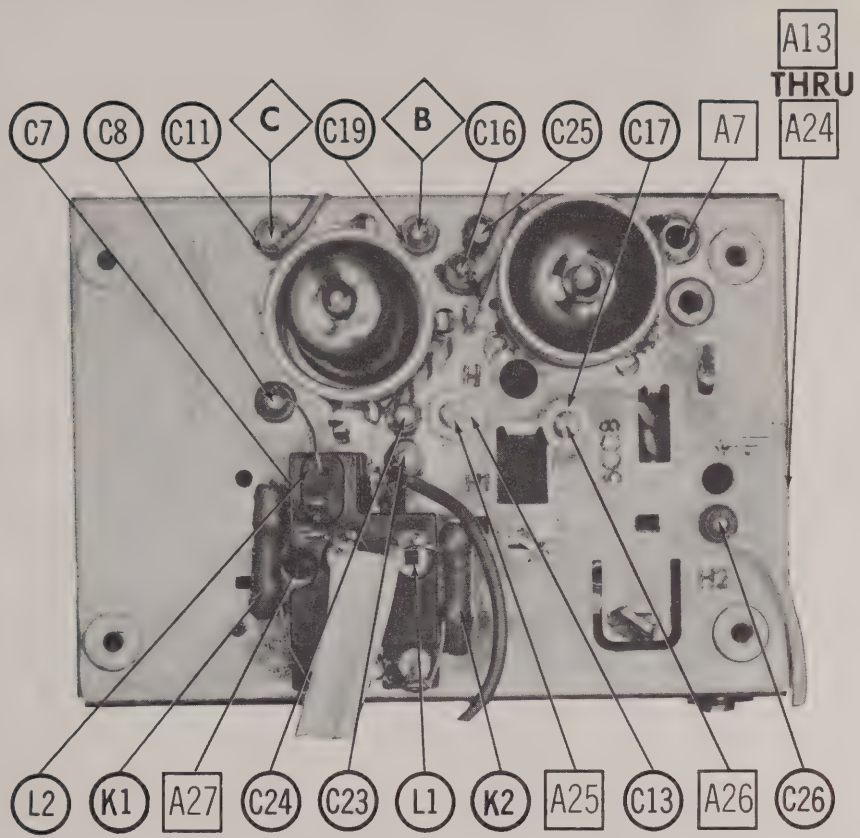
MISCELLANEOUS

ITEM No.	PART NAME	FIRESTONE PART No.	NOTES
M4	Tuner	211-27255	VHF Neutrode
	Tuner	211-27057	VHF Cascode
M5	Video Det. Assy.	13B-27003	Includes 4th. Video IF, Caps., RF Choke & Coils
M6	Centering Device	16M-23770	
M7	Ion Trap	16M-19705	
M8	Magnet	201-26614	Anti-pin Cushion (2 used)
M9	Yoke Clamp	49M-27154	
M10	Circuit Breaker	20F-27084	

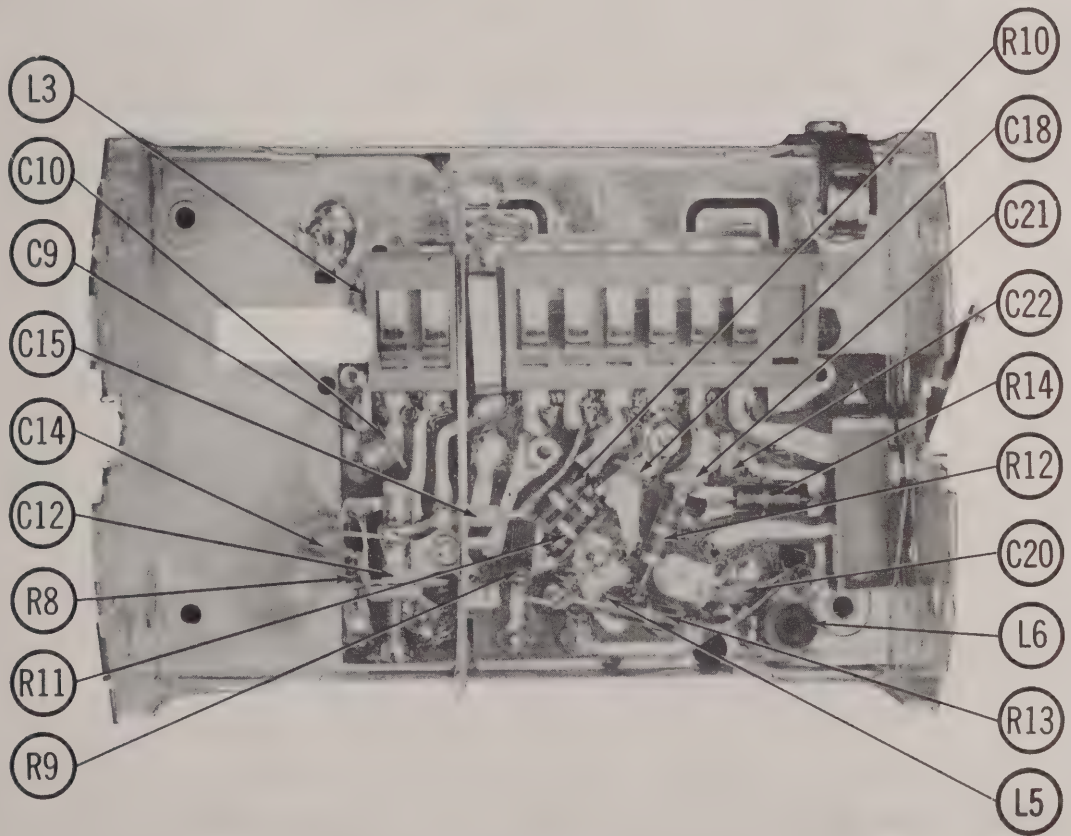
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

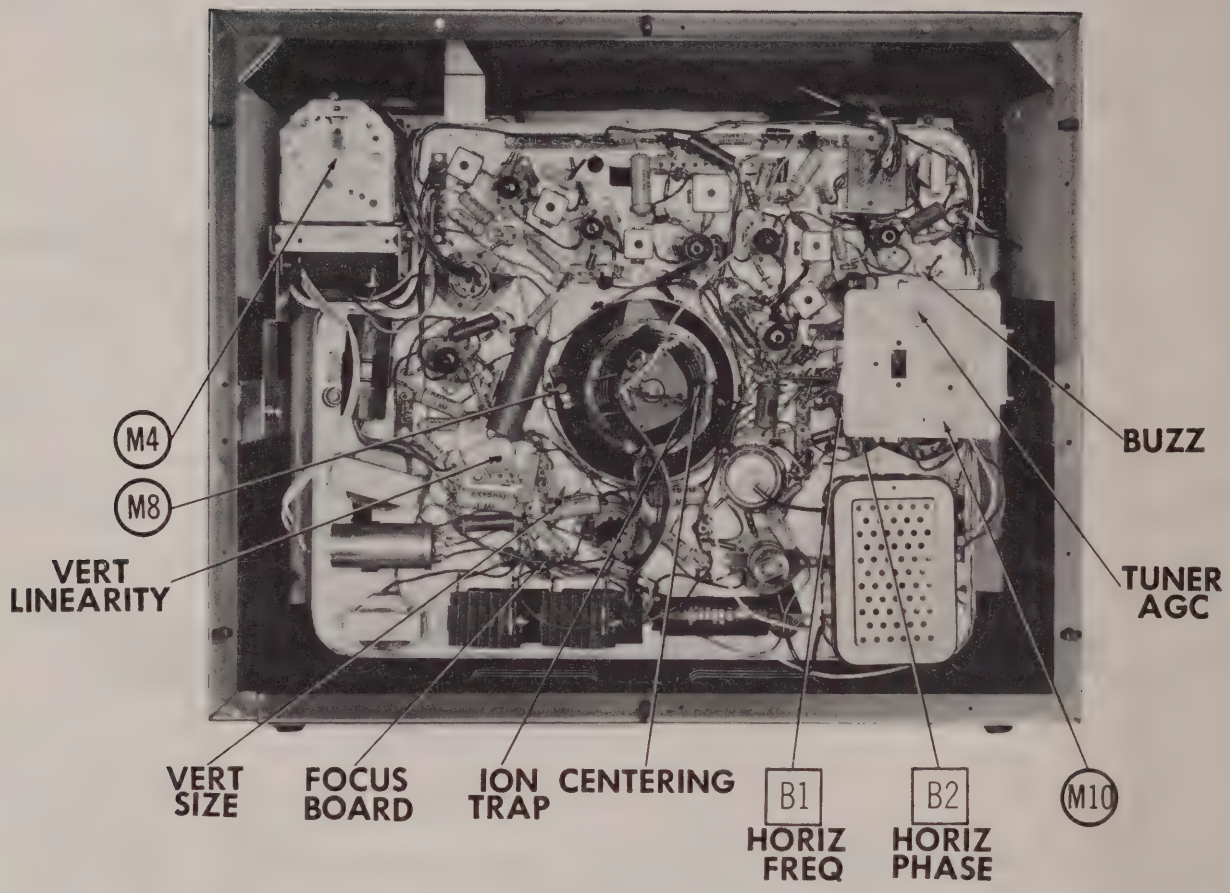
NAME	PART NO.	DESCRIPTION
Safety Glass	30M-26963	Models 13-G-211, 13-G-212, 13-G-213, 13-G-214, 13-G-215
Safety Glass	30M-27116	Models 13-G-216, 13-G-217
Mask	5M-26790-A193	Models 13-G-216, 13-G-217
Button	5A-26845-A195	On-off, Models 13-G-213, 13-G-216, 13-G-217
Button	5A-26855-A195	Channel Selector, Models 13-G-213, 13-G-216, 13-G-217
Indicator	5M-26873	Channel, Models 13-G-213, 13-G-216, 13-G-217
Indicator	6B-27016	Screen, Models 13-G-213, 13-G-216, 13-G-217
Knob	5B-26800-A29	On-off-volume, Model 13-G-211
Knob	5B-26800-A195	On-off-volume, Models 13-G-212, 13-G-214, 13-G-215
Knob	5B-27547-A195	Volume, Models 13-G-213, 13-G-216, 13-G-217
Knob	5B-26392-A29	Fine Tuning, Models 13-G-211, 13-G-212, 13-G-214, 13-G-215
Knob	5B-27546-A195	Fine Tuning, Models 13-G-213, 13-G-216, 13-G-217
Knob	5B-26395-A195	Channel Selector, Models 13-G-211, 13-G-212, 13-G-214, 13-G-215
Knob	5B-27542-A195	Picture
Knob	5B-27545-A195	Brightness
Knob	5B-27543-A195	Horiz. Hold
Knob	5B-27544-A195	Vert. Hold
Cabinet	200-27115	Models 13-G-211, 13-G-213
Cabinet	200-27115-1	Model 13-G-212
Cabinet	200-27478	Model 13-G-214
Cabinet	200-27478-1	Model 13-G-215
Cabinet	24D-26971	Model 13-G-216
Cabinet	24D-27081	Model 13-G-217



RF TUNER-TOP VIEW



RF TUNER-BOTTOM VIEW



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.

Turn the horizontal hold control (R3A) to the center of its range.

Connect a short clip lead across L27. Adjust the horizontal frequency coil slug (B1) until the picture synchronizes horizontally. Remove the clip lead from L27. Connect the vertical amplifier of the oscilloscope to point ⓓ. Low side to chassis. Adjust the horizontal waveform slug (B2) until a waveform similar to Fig. 5 is obtained with round and sharp peaks of equal amplitudes. While making this adjustment, keep the picture in sync with the horizontal hold control. Remove the scope connection and check the range of the horizontal hold control. The picture should fall out of sync at both extreme settings of the horizontal hold control.

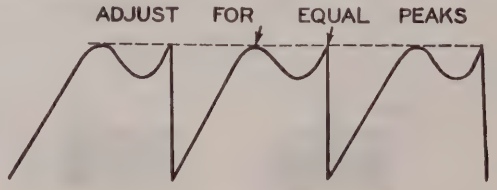
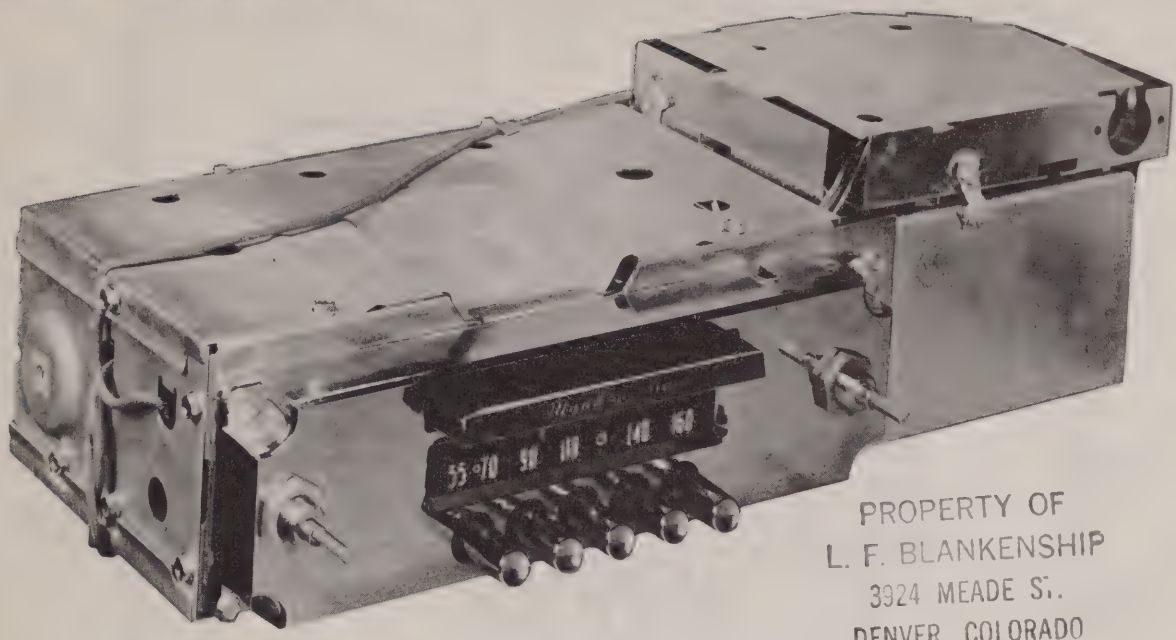


FIG. 5

BUICK
MODEL 981813



PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

BUICK
MODEL 981813

TRADE NAME	Buick Model 981813 (For 1957 Buick Automobiles)
MANUFACTURER	Delco Radio Div., G. M. Corp., Kokomo, Indiana
TYPE SET	Battery Operated Custom Built AM Automobile Receiver
TUBES (Eight)	Types 12BA6 RF Amp., 12BE6 Conv., 12BA6 IF Amp., 12BF6 Det.-AVC-AF Amp., 12AU7 Trigger, (2) 12V6GT Output, 0Z4 Rectifier
POWER SUPPLY	12 Volt Storage Battery — RATING 4 Amp. @ 12.6 Volts DC
TUNING RANGE—BROADCAST	550KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Tone control to "treble".
Sensitivity control to maximum (position 1).

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12BE6 (V2). Low side to chassis.	262KC (400~ Mod.)	High frequency end stop	DC probe to point (A). Common to chassis.	A1, A2, A3	To tune to high frequency end stop, place a .012" feeler gauge (or bare #28 wire) in slot against high frequency end stop. Press selector bar and let treadle bar arm run against feeler gauge. Turn radio off and then on. Adjust A1, A2, A3 for maximum deflection.
2.	"	"	"	"	"	A4	Adjust for MINIMUM deflection.
	Check setting of oscillator core (A8). Rear of core should be 1 5/8" from mounting end of coil form.						
3.	82MMF	High side to antenna receptacle. Low side to chassis.	1615KC	High frequency end stop.	DC probe to point (A). Common to chassis.	A5, A6 A7	Adjust for maximum output.
4.	"	"	600KC	Tune to 600KC signal.	"	A9, A10	"
5.	"	"	1615KC	High frequency end stop.	"	A6, A7	"
6.	"	"	1100KC	Tune to 1100KC signal.	"		If necessary, adjust pointer (with pointer adjustment screw) to coincide with 1100KC on dial.
7.	With radio installed in car and antenna fully extended, tune in a weak station between 600KC and 1000KC, adjust A7 for maximum volume.						

PUSHBUTTON ADJUSTMENT

1. Pull pushbutton to left and out.
2. Tune manually to desired station. Press pushbutton in firmly.
3. Repeat procedure on remaining pushbuttons.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	12BA6	
V2	Converter	12BE6	
V3	IF Amplifier	12BA6	
V4	Det. -AVC-AF Amplifier	12BF6	

ITEM No.	USE	TYPE	NOTES
V5	Trigger	12AU7	
V6	Output	12V6GT	
V7	Output	12V6GT	
V8	Rectifier	0Z4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	DELCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■20	400	6322	AFH3-120	C0990	FP345.8	TMT-106	T-550	TVL-3678
B	▲20	400							
C	20	25							

FIXED CAPACITORS

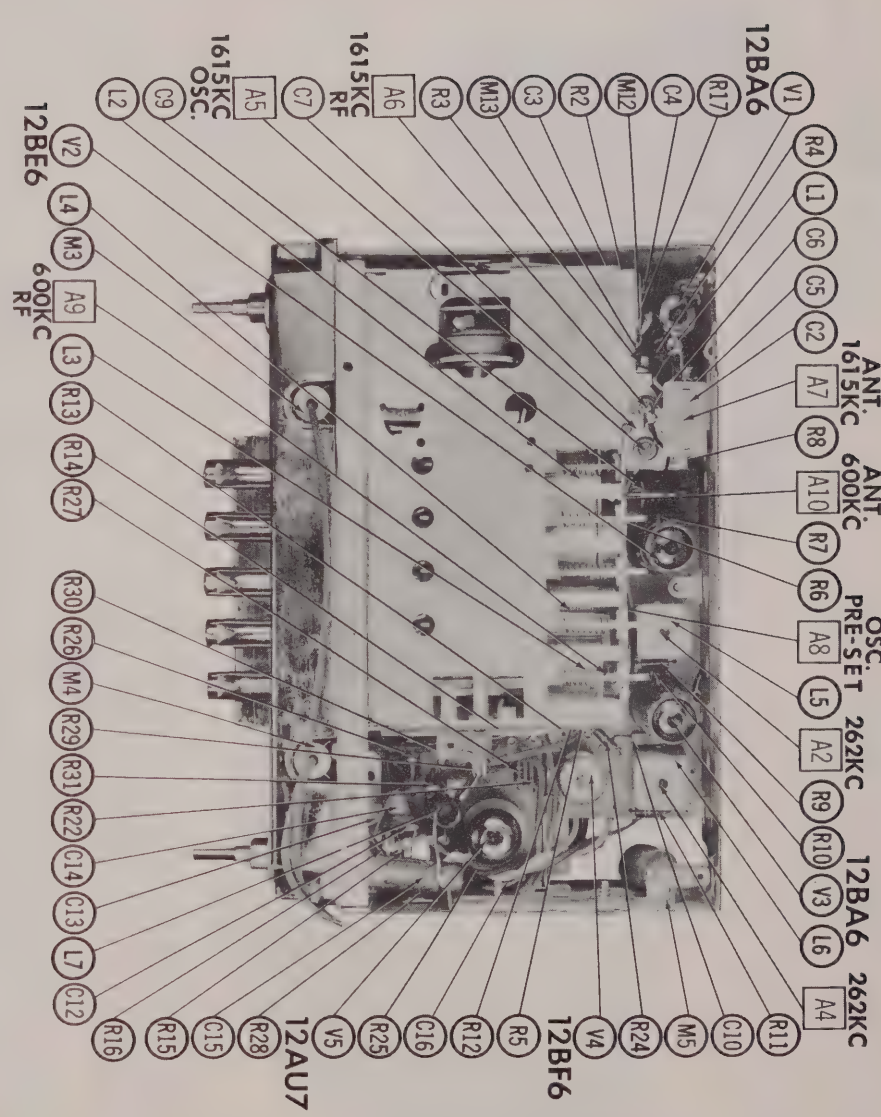
Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	DELCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2A			7269079							
B										
C3	.047	200	6612	BPD-05	DF-503	CUB2S47		GEM-4147	2TM-S47	
C4	.047	200	6612	BPD-05	DF-503	CUB2S47		GEM-4147	2TM-S47	
C5	68		6369	BPD-000068	DD-680	L10Q68	ED-68	UC-5468	5GA-Q68	
C6	39		6366	BPD-000039	DD-390	L10Q39	ED-39	UC-5439	5GA-Q39	
C7A										
B			7268828							
C										
D										
C8	200		7268904	1469-0002	TCZ-200	22R5T2	TCO-200		MS-32	5%
C9	.1	400	6613	P488N-1	DF-104	CUB4P1		GEM-401	4TM-P1	
C10	100	500	1219498	1469-0001	TCZ-100	22R5T1	TCO-100	ZT-531	MS-31	5%
C11	100	500	1219498	1469-0001	TCZ-100	22R5T1	TCO-100	ZT-531	MS-31	5%
C12	100	500	G-101	1468-0001	DD-101	5W5T1	ED-100	UC-531	1FM-31	
C13	.002	600	6628	BPD-002	D6-202	CUB6D2	ED-002	GEM-622	6TM-D2	
C14	.004	600	6630	BPD-004	D6-402	CUB6D4	ED-004	GEM-624	6TM-D4	
C15	.015	600	7237719	BPD-015	DD16-153	CUB6S15	ED-015	GEM-6115	6TM-S15	
C16	2000		6352	BPD-002	DD-202	BYA10D2	ED-002	DC522	5HK-D2	
C17	120		G-121	1469-00012	TCZ-121	22R5T12	TCO-120		MS-312	10%
C18	.2	400	6614	P488N-22		CUB6P2		GEM-602	6TM-P2	
C19	100		6371							N1500
C20	.003	1000	6563	P1088N-003	DD16-302	CUB10D3		GEM-1023	10TM-D3	
C21	.47	100	6692	P288N-47		CUB2P47		GEM-2047	2TM-P47	
C22	.007	1600	6567	P1688N-007	DD16-702	CUB16D7		GEM-1627	MB-D7	
C23	.1	200	6690	P288N-1	DF-104	CUB2P1		GEM-201	2TM-P1	
C24	.47	100	6692	P288N-47		CUB2P47		GEM-2047	2TM-P47	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	DELCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	250K	1/2	7268944				UE1381S	Tone
B	1Meg	1/2					Not Req.	Volume, Tap @ 300K
C	Switch						Not Req.	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	DELCO PART No.	IRC PART No.	
R2	2.2Meg		1239	BTS-2.2Meg	
R3	10K	1	1174	BTA-10K	
R4	330K		1229	BTS-330K	
R5	1.5Meg		1237	BTS-1.5Meg	
R6	100Ω		1113	BTS-100	
R7	22K		1215	BTS-22K	
R8	12K	2	1276	BTB-12K	
R9	10Ω		1101	BTS-10	
R10	150Ω		1115	BTS-150	
R11	100K		1223	BTS-100K	
R12	1Meg		1235	BTS-1Meg	
R13	1000Ω 5%		1220176	BTS-1000 5%	
R14	3300Ω 5%		1220173	BTS-3300 5%	
R15	820K		1234	BTS-820K	
R16	68K		1221	BTS-68K	
R17	100Ω		1113	BTS-100	
R18	1200Ω			BTS-1200	
R19	22K		1215	BTS-22K	
R20	150K		1225	BTS-150K	
R21	680K 5%		1220172	BTS-680K 5%	
R22	1Meg		1235	BTS-1Meg	
R23	330K 5%		1219490	BTS-330K 5%	
R24	1.5Meg 5%		1219492	BTS-1.5Meg 5%	
R25	5.6Meg		1244	BTS-5.6Meg	
R26	5600Ω 5%	1		BTA-5600 5%	Note 1
R27	820Ω 5%		7266231	BTS-820 5%	Note 2
R28	120K		1224	BTS-120K	
R29	47K	1	1259	BTA-47K	
R30	6800Ω	1	1172	BTA-6800	
R31	47K 5%	1	1220188	BTA-47K 5%	
R32	47K	1	1259	BTA-47K	
R33	360Ω 5%	1	7234563		
R34	1800Ω	3			Note 3
R35	15K	1	1253	BTA-15K	

Note 1. Some versions may use a 6800Ω 5% 1 Watt (Part #7266367)
Note 2. Some versions may use 910Ω 5% (Part #7266033) or 750Ω 5% (Part #7266320). Replace with original value.
Note 3. Mfgr. states to replace R34 with 2700Ω 2W (Part #1204) & 5600Ω 1W (Part #1171) connected in parallel.

TRANSFORMER (VIBRATOR)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	DELCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	12.6VCT @2.33A	500VCT @.070A			7269118			P-6495①		

① Use Orig. Channel Mtg. Frame

TRANSFORMER (AUDIO INPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	DELCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2			1220902						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	DELCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T3	8300Ω CT	3-4Ω	7269116	Z1011 ①	A-2901②	A-3824 ①	22S56 ①	S-55X ①	① Use original channel mounting frame ② Drill new mounting holes.

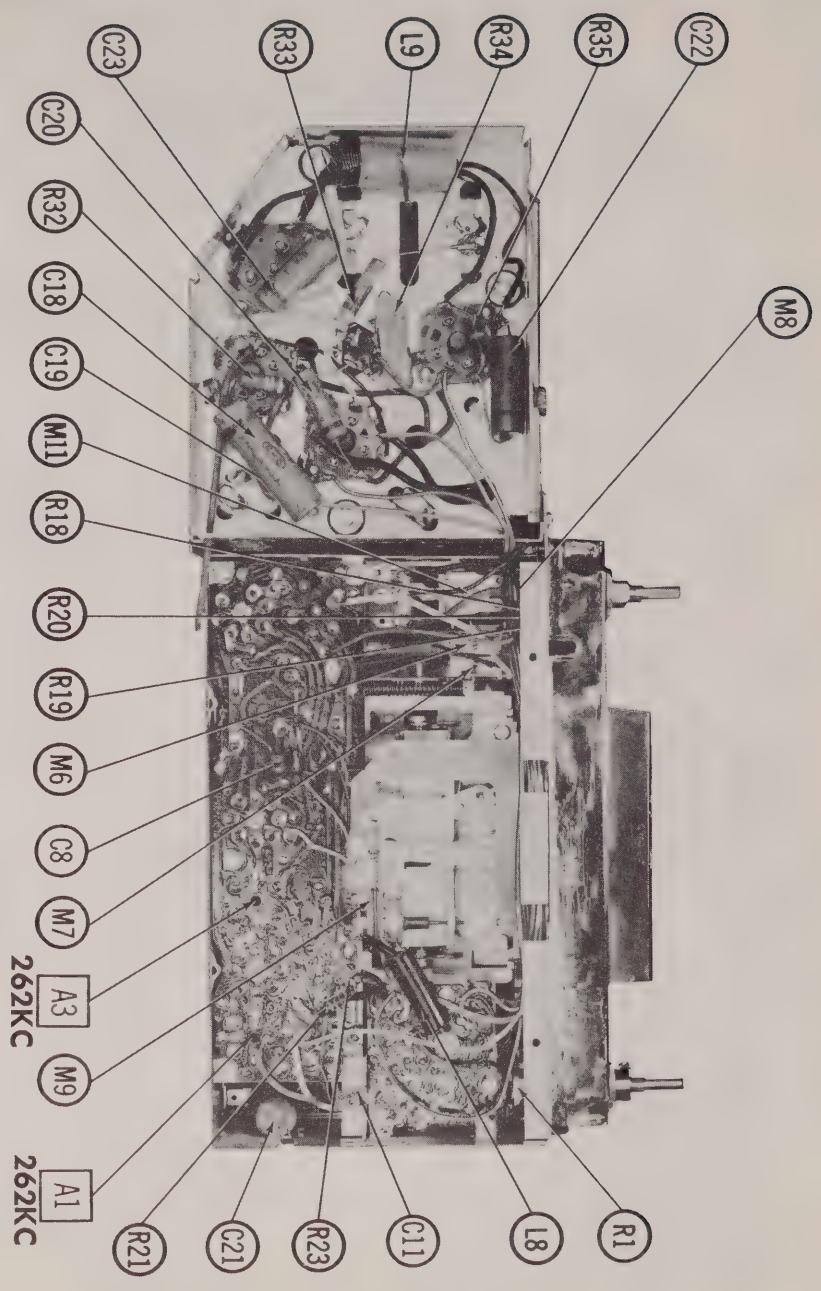
SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	DELCO PART No.	QUAM PART No.	
SP1	6"X9"	PM	3-4Ω	7269084	69A2	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		DELCO PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coupling Coil	7255738	19-1004	BC-565	4610	6.5 Microhenries
L2	Antenna Coil	1221050				
L3	RF Coil	1221050				
L4	Osc. Coil	1221051				
L5	Input IF	1220990	16-6756	BC-317	13-PH-1	
L6	Output IF	1220992				
L7	Fil. Choke	7241708				
L8	Fil. Choke	7269046	19-1001	BC-562	4604	1.5 Microhenries
L9	Vib. Hash Choke	1221077				42 Microhenries

CHASSIS BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA				NOTES
				DELCO PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	12. 6V	115~	8555	6330	G1602/G883	6330	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			DELCO PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	SFE	7½A	455640		30307. 5 (7AG 7½A)		SFE 7½A	

MISCELLANEOUS

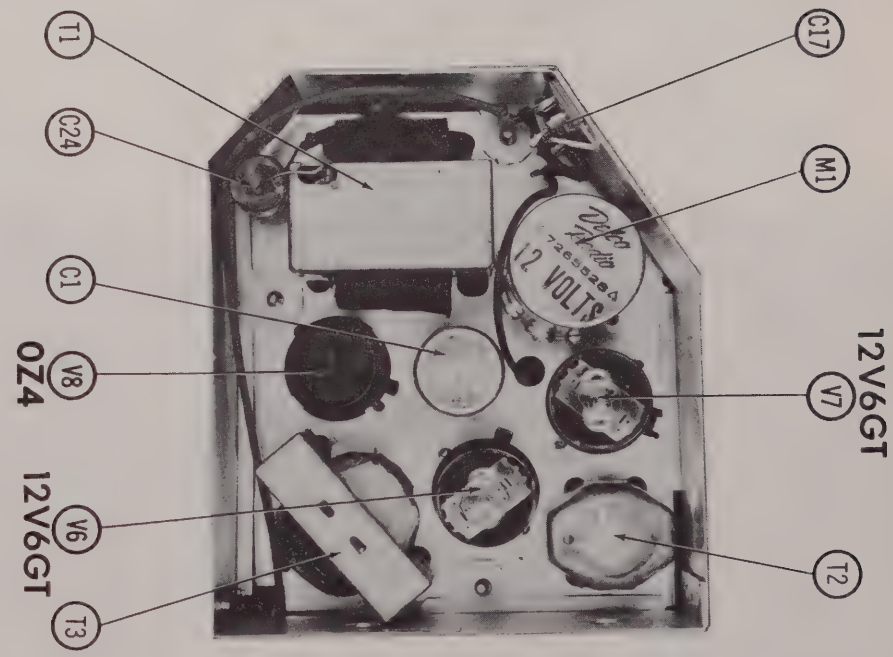
ITEM No.	PART NAME	DELCO PART No.	NOTES
M3	Dial Light	456985	#1891
M4	Dial Light	456985	#1891
M5	Spark Plate	1221054	
M6	Switch	7268030	Power Solenoid
M7	Switch	7268030	Treadle Solenoid
M8	Switch	7268938	Sensitivity
M9	Switch	7269292	Station Selector
M10	Switch	7269471	Foot
M11	Relay	7269582	Tuner
M12	Solenoid	7268040	Power
M13	Solenoid	7268050	Treadle

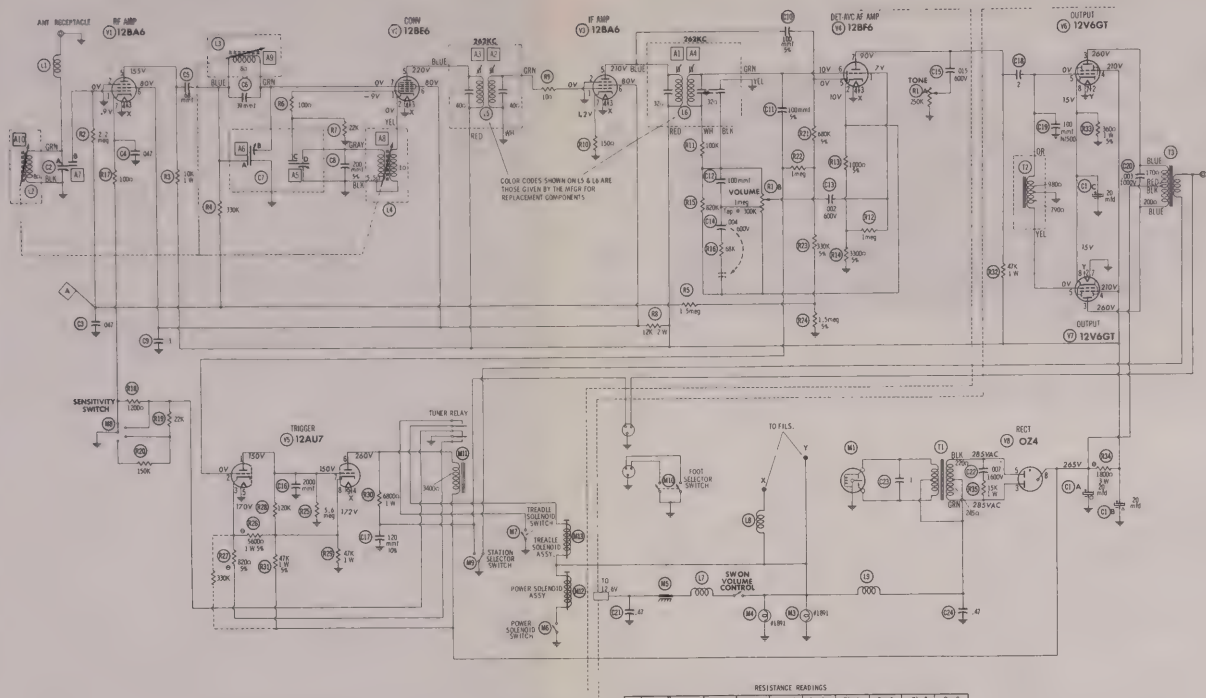
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Printed Panel	7268821-D	1 Tube Section
Printed Panel	7268814-C	4 Tube Section
Knob	1174606	Control
Knob	1175236	Tone
Knob	1175237	Sensitivity
Dial	7268943	

OUTPUT CHASSIS—TOP VIEW





1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2. Socket connections shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 12.6 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12BA6	5.2Meg	0Ω	1Ω	0Ω	0Ω	112K	114K	100Ω	
V2	12BE6	22K	1Ω	1Ω	0Ω	0Ω	1800Ω	114K	3.2Meg	
V3	12BA6	90Ω	0Ω	1Ω	0Ω	0Ω	1800Ω	114K	1500	
V4	12BF6	1Meg	430Ω	1Ω	0Ω	0Ω	2.5Meg	500K	1.4MK	
V5	12AU7	160K	2.8Meg	150K	1Ω	0Ω	3420Ω	160K	47K	5Ω
V6	12V6GT	TP	1Ω	170Ω	1800Ω	580Ω	TP	0Ω	360Ω	
V7	12V6GT	NC	1Ω	200Ω	1800Ω	790Ω	TP	0Ω	360Ω	
V8	0Z4	0Ω	NC	28KΩ	NC	220Ω	NC	TP	20K MIN	

T MEASURED FROM PIN 8 OF V8.
TP TIE POINT.
NC NO CONNECTION

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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3924 MEADE ST.
DENVER, COLORADO

BULOVA
MODEL 270 Series

MODEL 278

BULOVA
MODEL 270 Series

TRADE NAME	Bulova Model 270 Series
MANUFACTURER	Electronics Guild, Inc., Sunrise Highway, Valley Stream, Long Island, N. Y.
TYPE SET	Battery Operated Portable AM Transistorized Receiver
POWER SUPPLY	9 Volts DC
RATING	20 MA@ 9 Volts DC
TUNING RANGE—BROADCAST	540KC-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05MFD	High side to base of CK766 (X1). Low side to B-.	455KC (400~ Mod.)	Tuning gang fully open	Across voice coil	A1, A2,	Adjust for maximum output. Repeat until no further improvement is noted.
2	"	"	1640KC	"	"	A3	Adjust for maximum output.
3	"	"	535KC	Tuning gang fully closed	"	A4	"
4	"	"	1640KC	Tuning gang fully open	"	A3	"
5		Loop	1400KC	Tune to 1400KC signal	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Rock tuning gang while adjusting A5. Check tracking at 600 & 1000KC.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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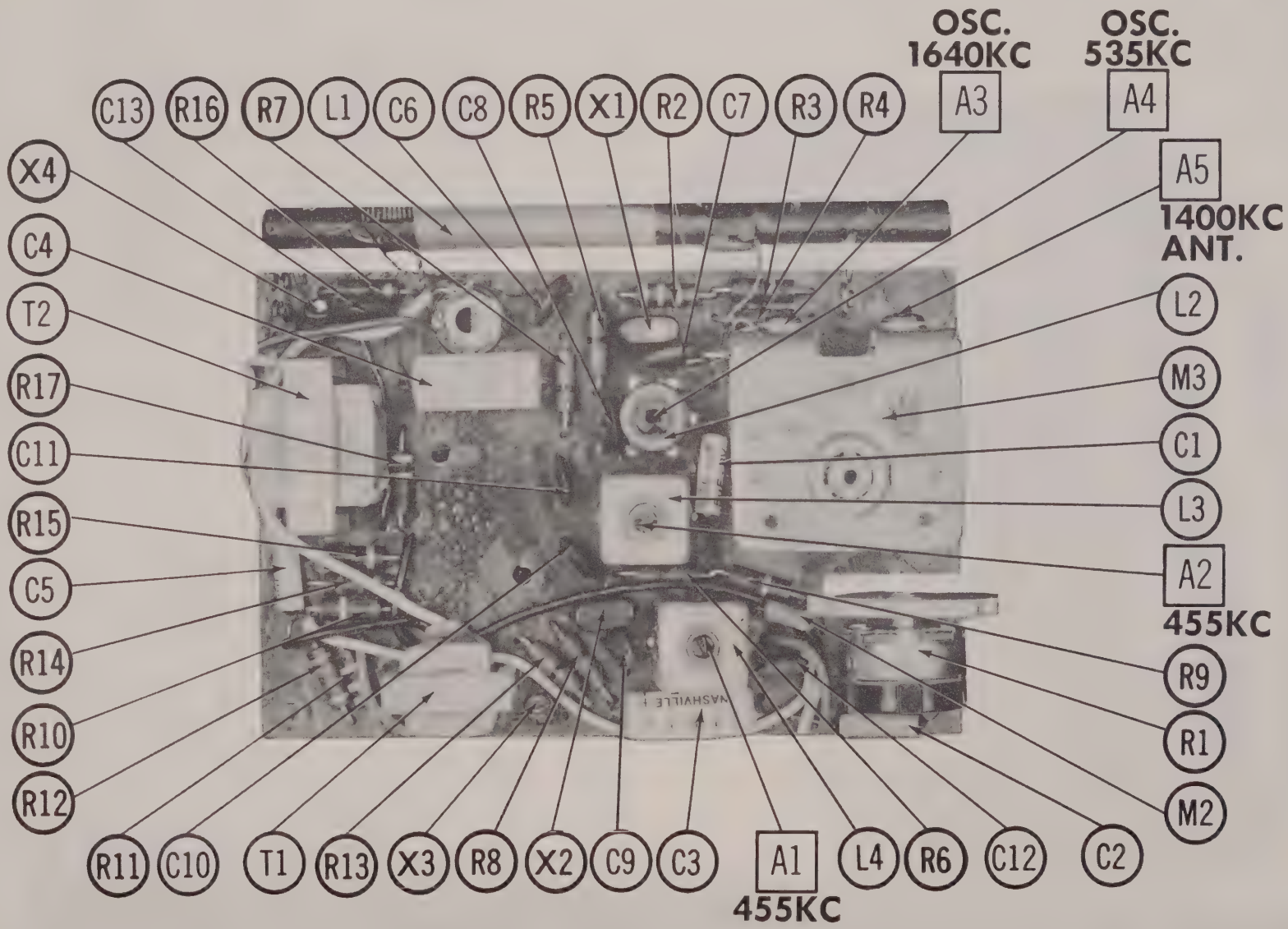


CHASSIS-TOP VIEW

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA		NOTES
			CBS PART No.	SYLVANIA PART No.	
X1	CK766	Converter			
X2	2N112A	IF Amplifier			
X3	2N132	Driver			
X4	2N138A	Output			

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	BULOVA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	5	3		XPP3V6	NL5-6	TT6X5	ML5-6		TE-1084
C2	5	3		XPP3V6	NL5-6	TT6X5	ML5-6		TE-1084
C3	50	3		XPP3V50	NL50-3	TT6X50	ML50-3		TE-1100
C4	40	10		XPP10V40	NL50-10	TT10X50	ML40-15		R2329 *
C5	5	3		XPP3V6	NL5-6	TT6X5	ML5-6		TE-1084

* Non Catalog Item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	BULOVA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C6	10000								TG-S10	
C7	5000								TG-D50	
C8	20000									
C9	22			BPD-000022	DD-220	L10Q22	ED-22	UC-5422	5GA-Q22	
C10	20000									
C11	20000									
C12	10000								TG-S10	
C13	10000								TG-S10	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	BULOVA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	10000Ω	1/4	22-9					Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	BULOVA PART No.	IRC PART No.	
R2	33K			BTS-33K	
R3	15K			BTS-15K	
R4	5100Ω 5%			BTS-5100 5%	
R5	1000Ω			BTS-1000	
R6	1000Ω			BTS-1000	
R7	1000Ω			BTS-1000	
R8	1000Ω			BTS-1000	
R9	10K			BTS-10K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	BULOVA PART No.	IRC PART No.	
R10	150K			BTS-150K	
R11	33K			BTS-33K	
R12	8200Ω			BTS-8200	
R13	1000Ω			BTS-1000	
R14	5100Ω 5%			BTS-5100 5%	
R15	750Ω 5%			BTS-750 5%	
R16	56Ω 5%			BTS-56 5%	
R17	470Ω			BTS-470	

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (INPUT)

ITEM No.	Turns Ratio		REPLACEMENT DATA						NOTES
	PRI.	SEC.	BULOVA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	6:	1	24-23	GH119 ①			TR-19 ①		① Tape center tap on primary winding.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	BULOVA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	896Ω	14Ω	24-24	GH7 ①		TA-9 ①		TY-44X①	① Bend ears down.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	BULOVA PART No.	QUAM PART No.	
SP1	2 3/4"	PM	14Ω	26-11		

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		BULOVA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Stick					
L2	Osc. Coil					
L3	Input IF		16-9002			
L4	Output IF		16-9002			

BATTERIES

ITEM No.	VOLTAGE	BULOVA PART No.	REPLACEMENT DATA								NOTES
			BURGESS		EVEREADY		MALLORY		RAY-O-VAC		
			"A"	"B"	"A"	"B"	"A"	"B"	"A"	"B"	
M1	9V			2N6		246		M-1602		1600	

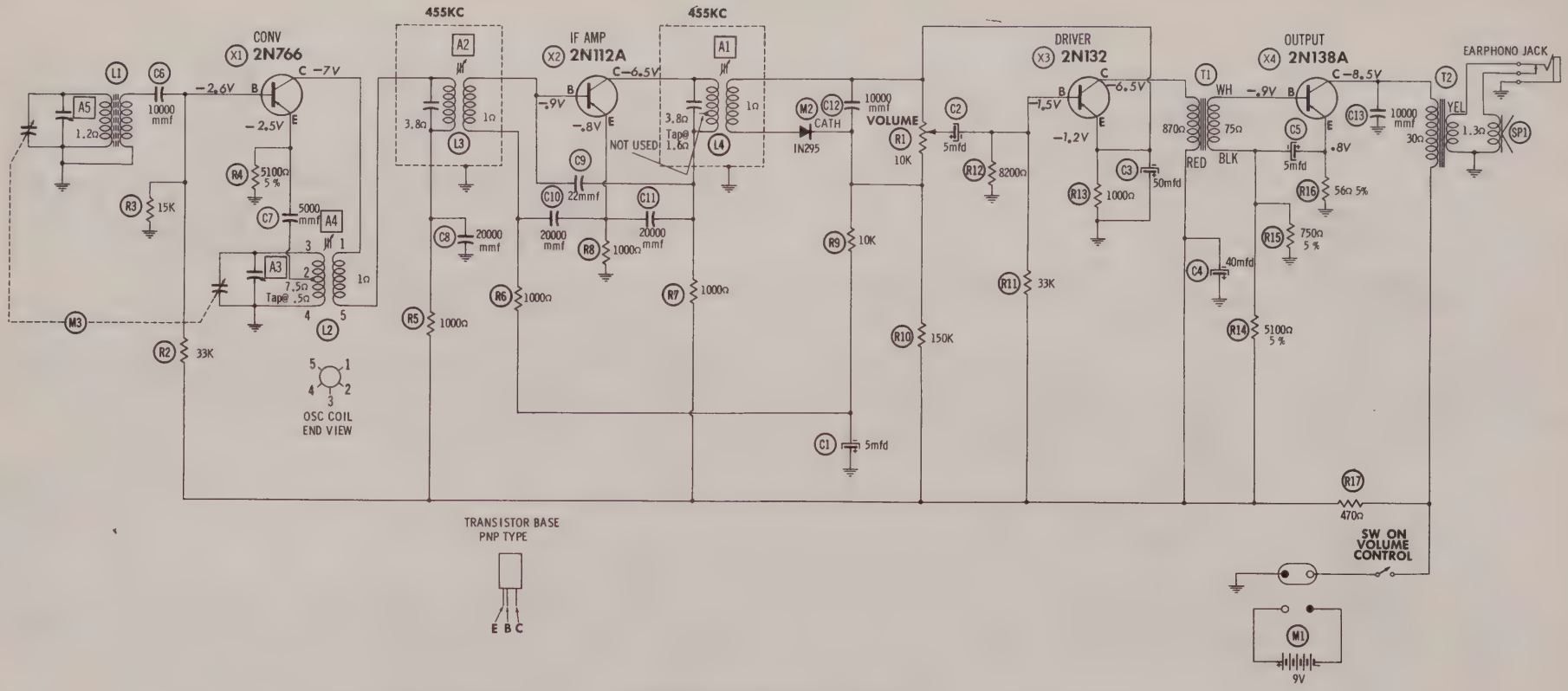
CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		BULOVA PART No.	CBS PART No.	SYLVANIA PART No.	
M2	1N295		1N60	1N60	Audio Det. (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	BULOVA PART No.	NOTES
M3	Tuning Cap.		2 Gang (Ant. 12-140MMF)

BULOVA MODEL 270 Series



1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum. no signal applied for voltage measurements.

RESISTANCE READINGS NOT TAKEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

PHOTOFACT STANDARD NOTATION SCHEMATIC

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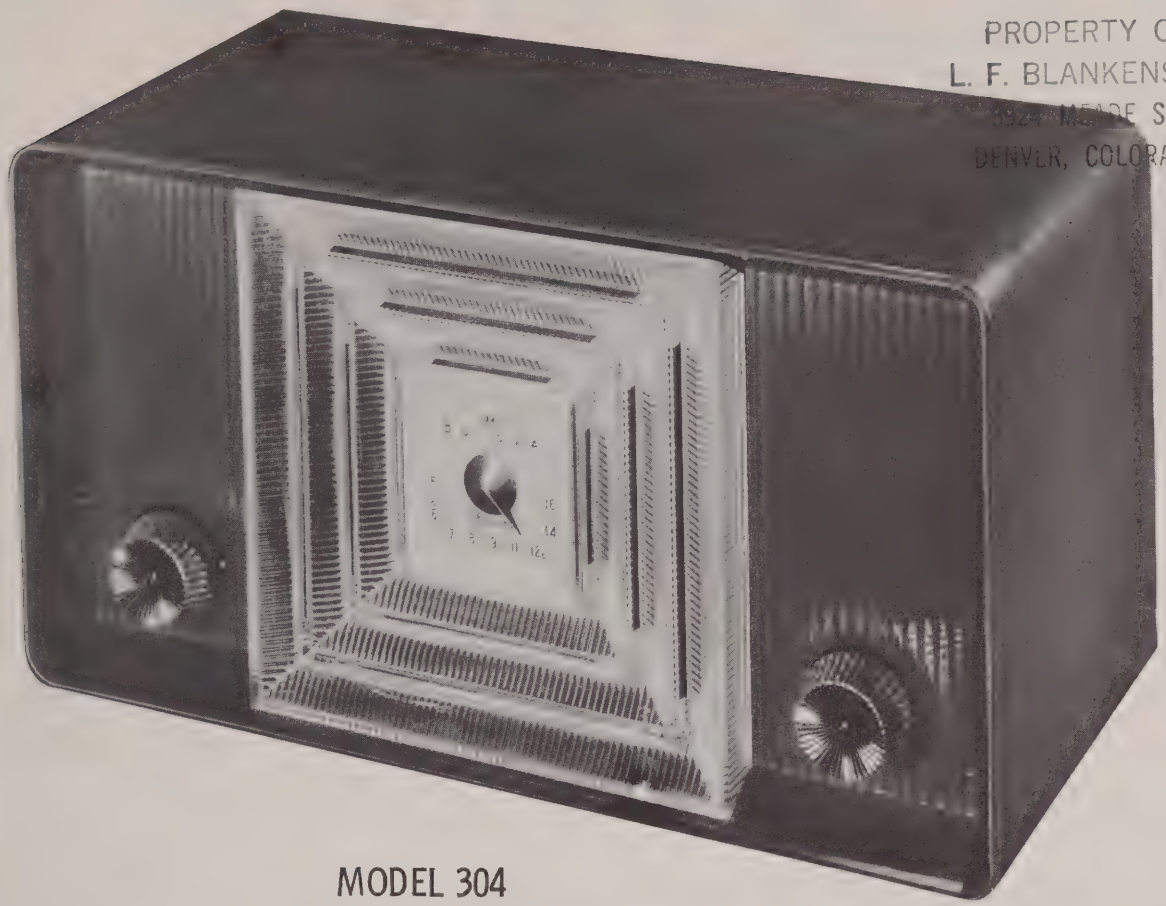

MODEL 304

BULOVA
MODEL 300 Series

TRADE NAME	Bulova Model 300 Series
MANUFACTURER	Electronics Guild, Inc., Sunrise Highway, Valley Stream, Long Island, N.Y.
TYPE SET	AC-DC Operated AM Receiver
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-120 Volts AC-DC RATING .27 Amp. @ 117 Volts AC (26 Watts)
TUNING RANGE—BROADCAST	535KC-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in the same relative position to chassis as when the receiver is in cabinet.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2 A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1640KC	"	"	A5	"
3.		Loop	1400KC	1400KC	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det. -AVC-AF Amplifier	12AV6	
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	BULOVA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	50	150		PRS150V5050	BBRD5515	TCD49	TMD-13	MTD-1550	TVA-2453
B	50	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	BULOVA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.1	200		P288N-1	DF-104	CUB2P1		GEM-201	2TM-P1	
C3	.05	400		BPD-05	DF-503	CUB4S5		GEM-415	4TM-S5	
C4	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C5	.01	400		BPD-01	DD-103	CUB4S1	GP-10000	GEM-411	4TM-S1	
C6	.05	400		BPD-05	DF-503	CUB4S5		GEM-415	4TM-S5	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	BULOVA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500K	½		B-60	A47-500K-Z	Q13-133	U48	Volume
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
C	Switch			KB-1	SWE-12	76-1	US-26	

RESISTORS

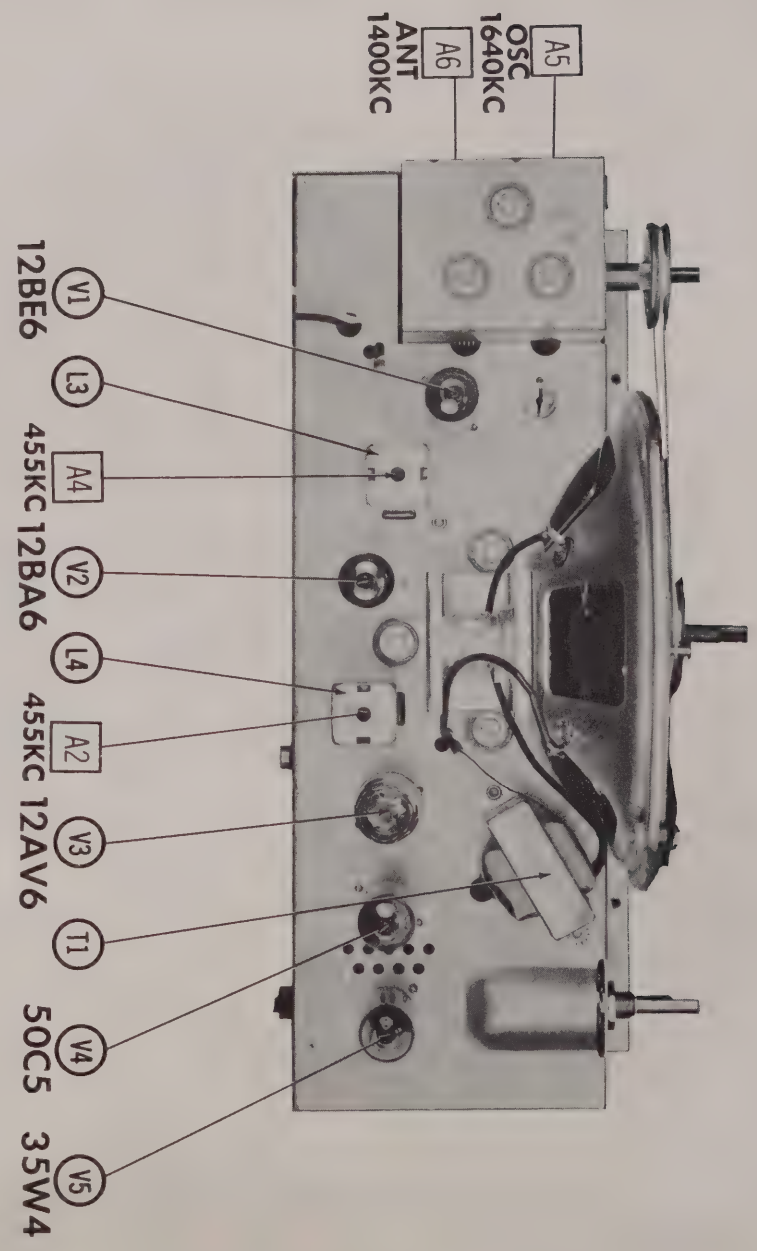
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	BULOVA PART No.	IRC PART No.	
R2	22K			BTS-22K	
R3	1Meg			BTS-1Meg	
R4	68Ω			BTS-68	
R5	3.3Meg			BTS-3.3Meg	
R6	47K			BTS-47K	
R7	150Ω			BTS-150	
R8	1500Ω	1		BTA-1500	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	BULOVA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2600Ω tapped	3-4Ω	24-5	Z1103	A-3031	A-3336	24S50A	S-16X	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	BULOVA PART No.	QUAM PART No.	
SP1	6"	PM	3-4Ω	26-4	6A1	

COILS (RF-IF)

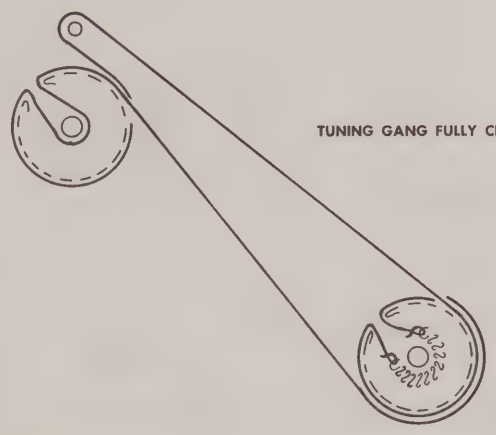
ITEM No.	USE	REPLACEMENT DATA				NOTES
		BULOVA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Antenna					Includes Cabinet Back.
L2	Osc. Coil					
L3	Input IF		16-6758	BC-352	12-C1	
L4	Output IF		16-6758	BC-353	12-C2	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	BULOVA PART No.	REPLACEMENT DATA
K1	Audio Coup. Net.	2000MMF, 220MMF, 5000MMF, 250MMF, 470K, 470K, 6.8Meg		Aerovox PA-113-1 Centralab PC-150 Cornell Dubilier 116TM1 Erie 1408-01 Sprague DT-5

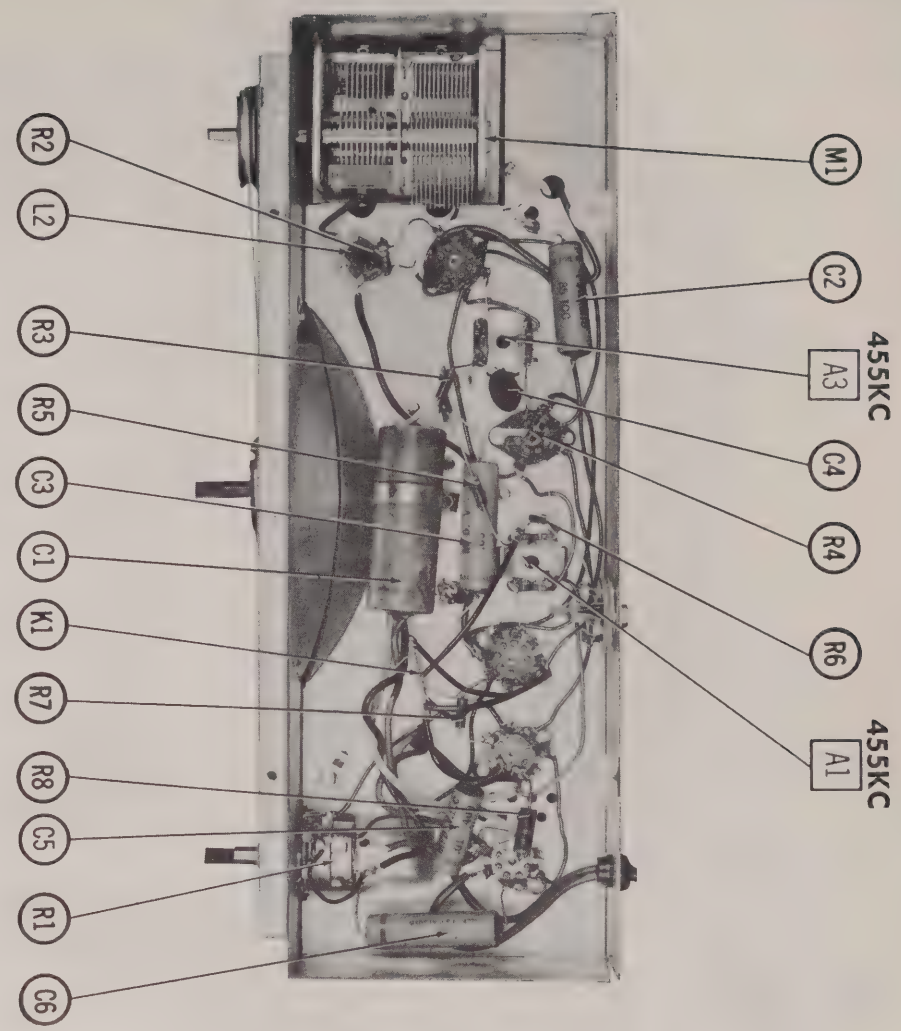
MISCELLANEOUS

ITEM No.	PART NAME	BULOVA PART No.	NOTES
M1	Tuning Cap.		2 Gang (Ant. 30-480MMF, Osc. 18-125MMF)

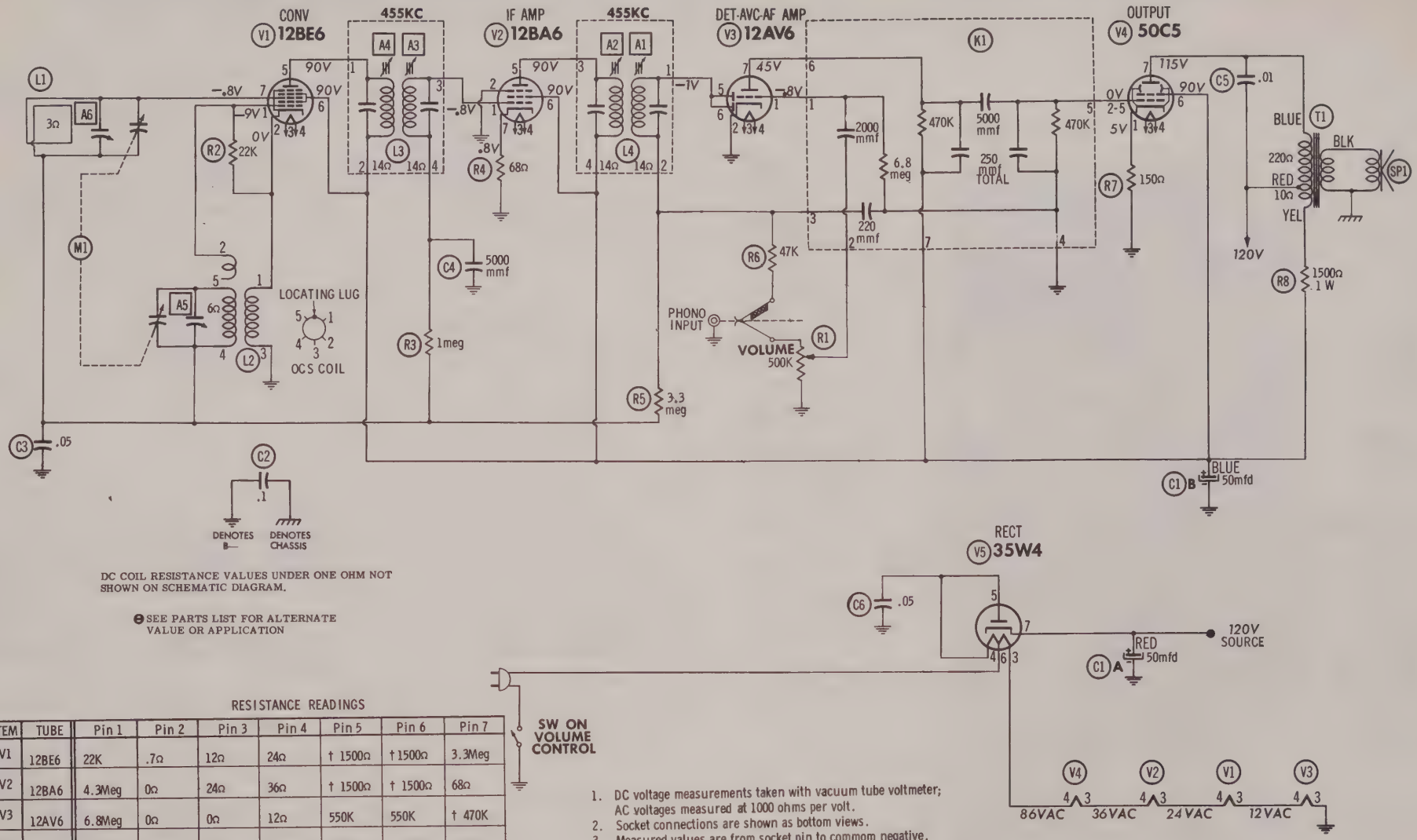


DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW



BULOVA MODEL 300



DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	.7Ω	12Ω	24Ω	† 1500Ω	†1500Ω	3.3Meg
V2	12BA6	4.3Meg	0Ω	24Ω	36Ω	† 1500Ω	† 1500Ω	68Ω
V3	12AV6	6.8Meg	0Ω	0Ω	12Ω	550K	550K	† 470K
V4	50C5	150Ω	470K	36Ω	75Ω	470K	† 1500Ω	† 220Ω
V5	35W4	TP	NC	75Ω	110Ω	110Ω	100Ω	20K MIN

† MEASURED FROM PIN 7 OF V5.
TP TIE POINT.
NC NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to commom negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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CRAFTSMEN
MODEL CTA-5

CRAFTSMEN
MODEL CTA-5

TRADE NAME	Craftsmen Model CTA-5	
MANUFACTURER	Radio Craftsmen Inc., 4223 W. Jefferson Blvd., Los Angeles 16, Calif.	
TYPE SET	AC Operated FM-AM Receiver	
TUBES	Twelve	
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING .77 Amp. @ 117 Volts AC (82 Watts)
TUNING RANGE—BROADCAST	540KC-1650KC	FREQ. MOD. 88MC-108MC

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

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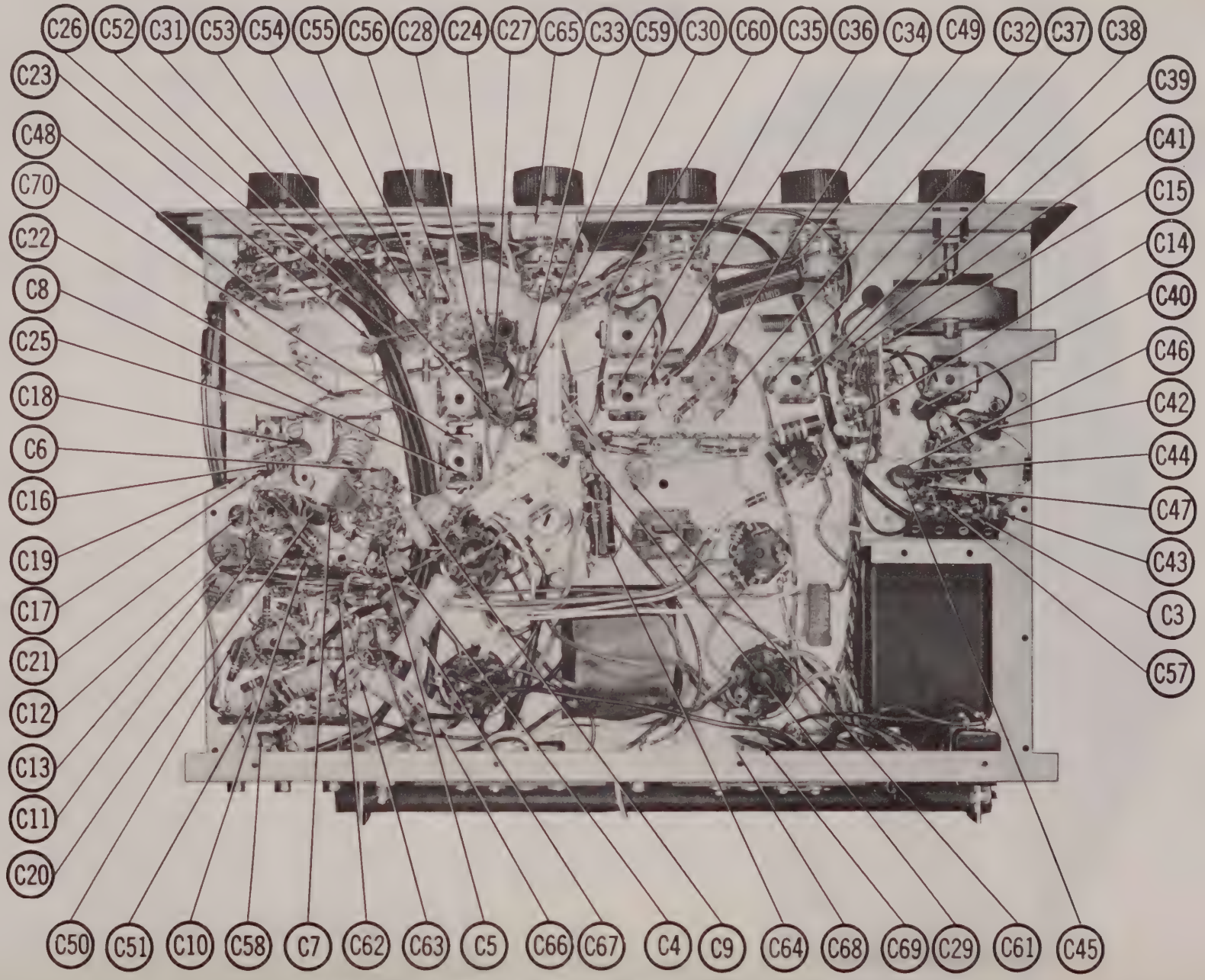
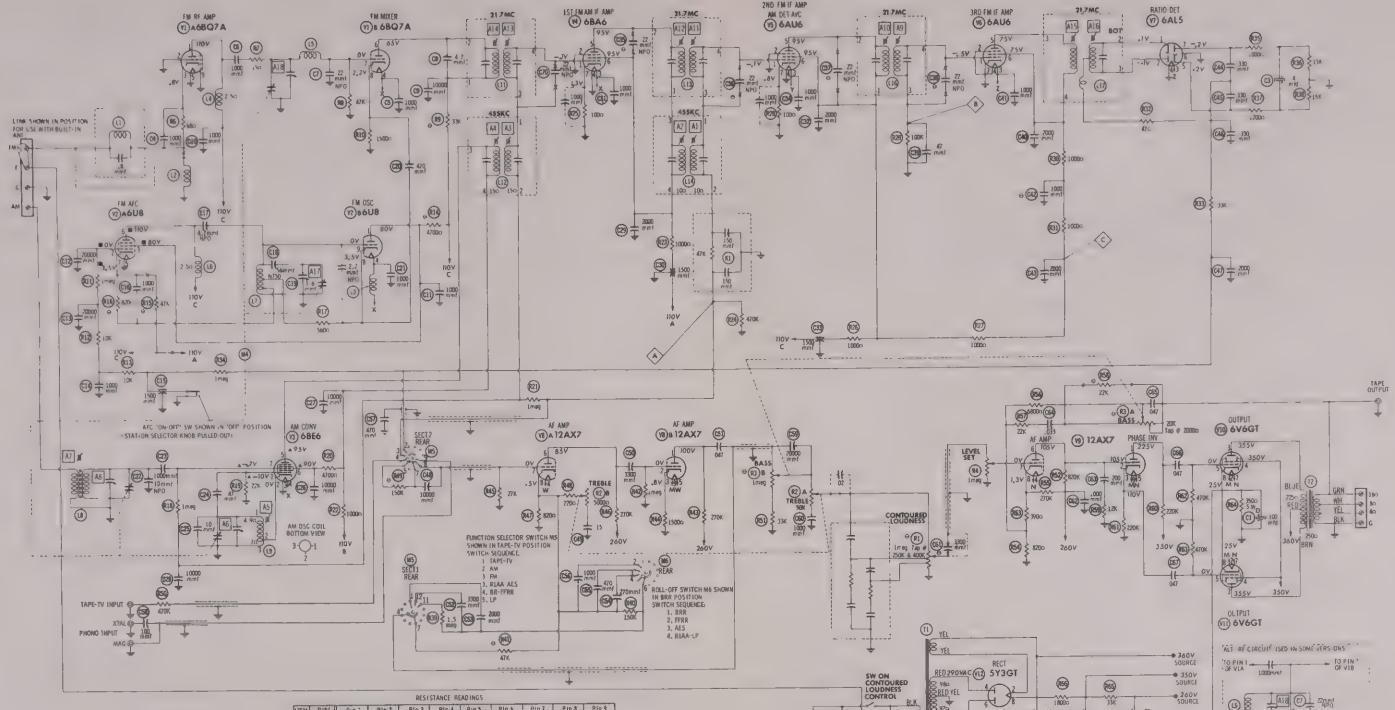


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 6	Pin 5	Pin 4	Pin 7	Pin 8	Pin 9
V1	6BQ7A	†10000Ω	0Ω	68Ω	.1Ω	0Ω	†34K	47K	13000Ω	0Ω
V2	6U8	† 570Ω	∞ 1MEG	† 570Ω	.1Ω	0Ω	† 11000Ω	825Ω	560Ω	0Ω
V3	6B6	22K	.7Ω	0Ω	.1Ω	†∞ 3000Ω	†∞ 47000Ω	∠7 40meg		
V4	6BA6	∠ 4Meg	0Ω	1Ω	0Ω	∗2000Ω	∗70000Ω	100Ω		
V5	6AU6	500K	0Ω	1Ω	0Ω	∗2000Ω	∗2000Ω	100Ω		
V6	6AU6	100K	0Ω	1Ω	0Ω	∗50000Ω	∗50000Ω	0Ω		
V7	6AL5	∞ 1MEG	∞ 1MEG	1Ω	0Ω	16K	0Ω	16K		
V8	12AX7	† 330K	1Meg	1500Ω	325Ω	325Ω	† 330K	27K	820Ω	325Ω
V9	12AX7	† 220K	† 820K	220K	325Ω	325Ω	† 820K	0Ω	1200Ω	325Ω
V10	6V6GT	TP	325Ω	† 225Ω	† 1800Ω	470K	TP	325Ω	350Ω	
V11	6V6GT	TP	325Ω	† 250Ω	† 1800Ω	470K	TP	325Ω	350Ω	
V12	5Y3GT	NC	220Ω MEG	NC	98Ω	NC	92Ω	NC	220Ω MEG	

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED
† MEASURED FROM PIN 2 OF V12
∗ MEASURED FROM OUTPUT OF M1
∠ MEASURED WITH AFC ON
* MEASURED IN "AM" POSITION
NC NO CONNECTION
TP TIE POINT

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUE IN UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

1. DC voltage measurements taken with vacuum tube voltmeter. AC voltages measured at 1000 ohms per volt
2. Socket connections are shown as bottom views
3. Measured values are from socket pin to common negative
4. Line voltage maintained at 117 volts for voltage readings
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings
6. Volume control at maximum, no signal applied for voltage measurements

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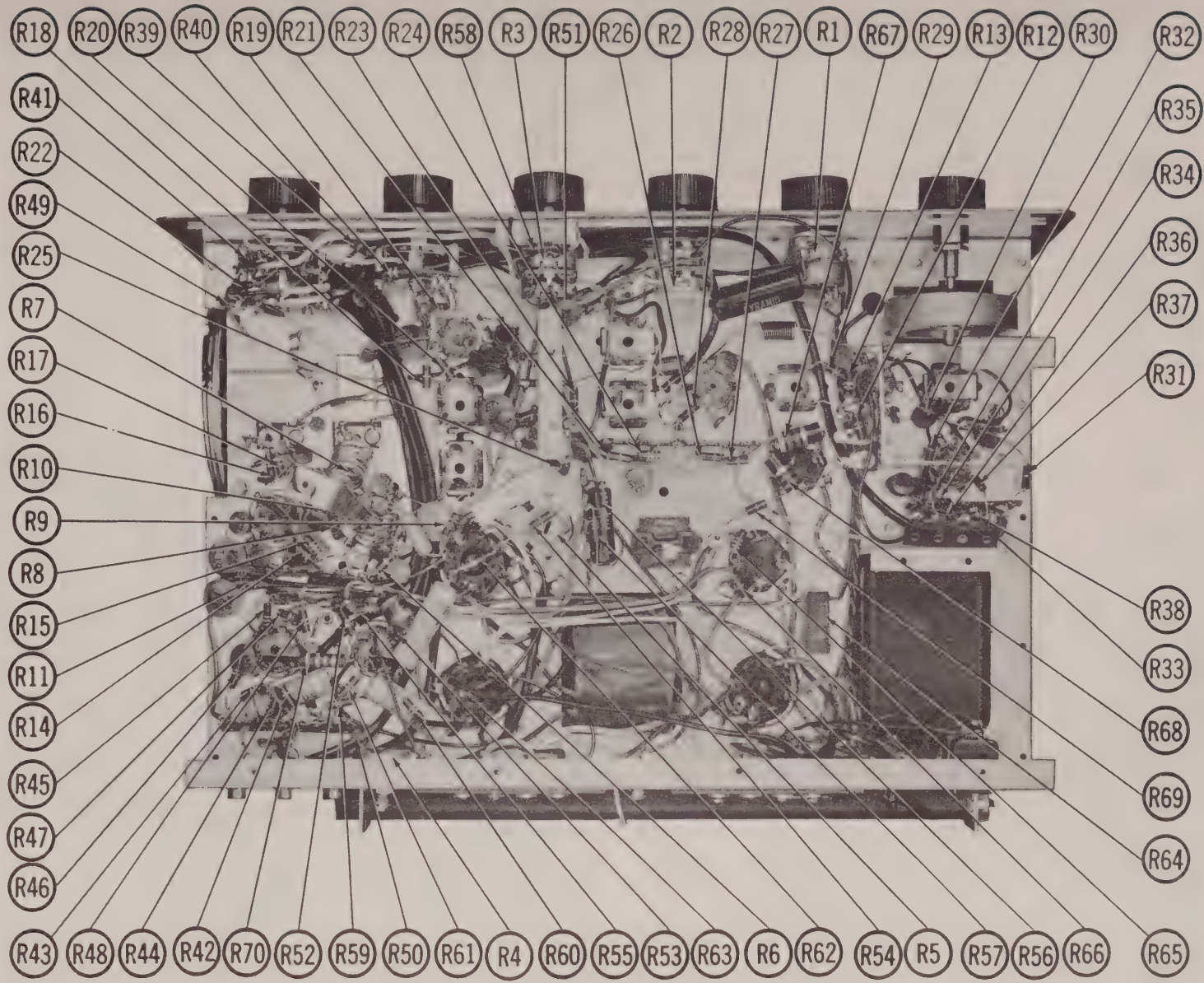


CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE St.
DENVER, COLORADO

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Loudness control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
With gang fully closed set dial pointer to dial base line at left end of dial.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1	.01MFD	High side to pin 7 (grid) of 6BE6 (V3). Low side to chassis.	455KC (unmod.)	AM	Point of non-interference	DC probe to point (A) Common to chassis.	A1, A2, A3, A4	Adjust for maximum deflection.
2	220MMF	High side to AM Antenna terminal. Low side to chassis.	600KC	"	600KC	"	A5	"
3	"	"	1500KC	"	1500KC	"	A6	Adjust for maximum deflection. Repeat step 2 & 3 until nor further improvement is noted.
4	"	"	600KC	"	600KC	"	A7	Adjust for maximum deflection.
5	"	"	1500KC	"	1500KC	"	A8	Adjust for maximum deflection. Repeat steps 4 & 5 until no further improvement is noted.

FM ALIGNMENT

Steps 7 & 8 — Due to a slight frequency shift (decrease when bottom plate of chassis is replaced) dial setting should be slightly higher than signal generator setting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6	100MMF	High side to pin 7 (grid) of 6BQ7A (V1). Low side to chassis.	21.7MC (unmod.)	FM	Point of non-interference	DC probe to point (B) Common to chassis.	A9, A10, A11, A12, A13, A14	Adjust for maximum deflection.
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
7	68Ω Carbon Resistor	High side to FM Antenna terminal. Low side to chassis.	89MC (250KC Swp)	FM (AFC Off)	89.8MC	Vert Amplifier thru .1MFD to point (C) Low side to chassis.	L7	Compress or expand coil turns so that 89MC marker appears at peak of response curve similar to Fig. 1.
8	"	"	106.8MC	"	107.5MC	"	A17	Adjust so that 106.8MC marker appears at peak of response curve similar to Fig. 1. Repeat steps 7 & 8.
9	"	"	89MC	"	Tune to 89MC signal	"	L5	Compress or expand coil turns for curve of maximum amplitude and symmetry similar to Fig. 1.
10	"	"	106.8MC	"	Tune to 106.8 MC signal	"	A18	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1. Repeat steps 9 & 10.
11	"	"	98MC (Off station)	"	Tune to 98MC signal	"	A9, A10, A11, A12, A13, A14	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
12	"	"	"	"	"	Across Speaker terminals	A15, A16	Adjust A16 so that 98MC occurs at center of crossover lines similar to Fig. 2. Adjust A15 for maximum amplitude and straightness of crossover lines.

FIG. 1

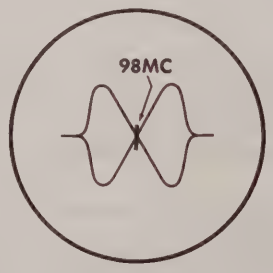
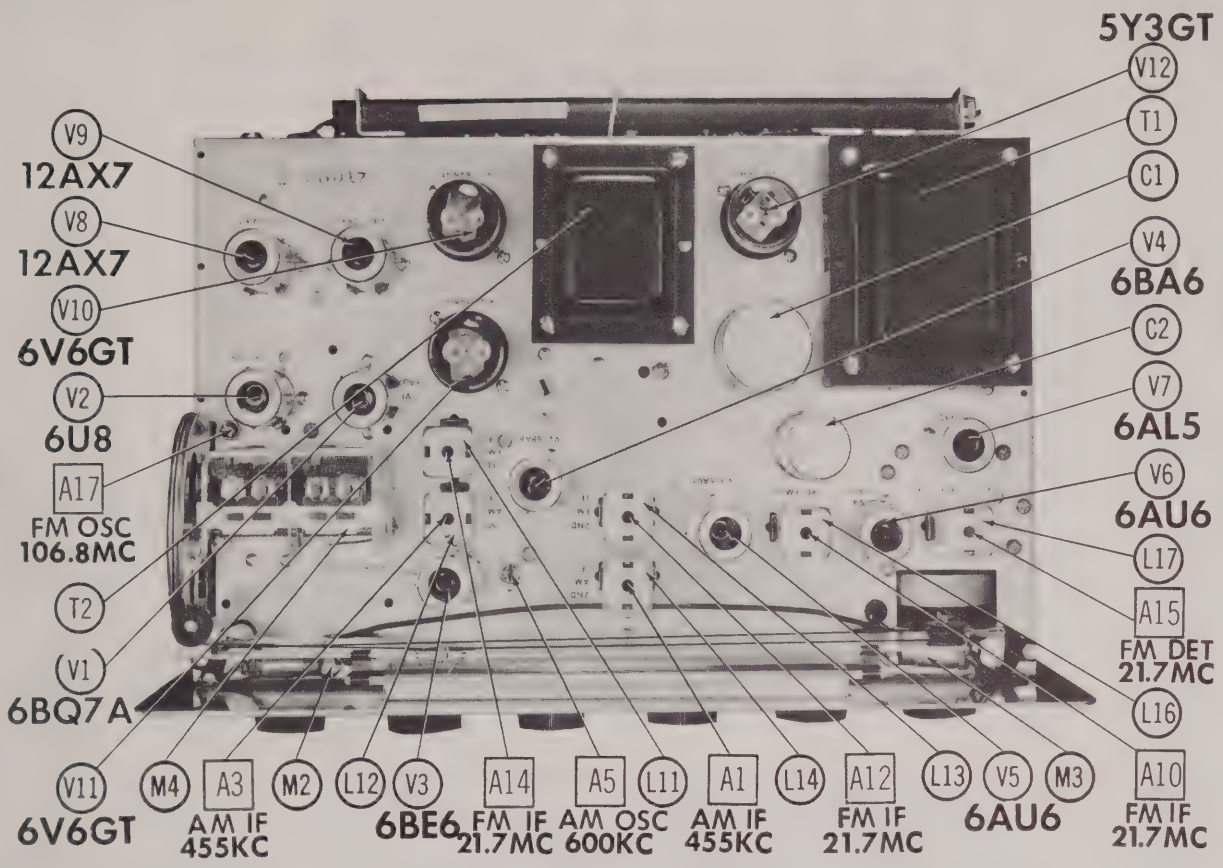
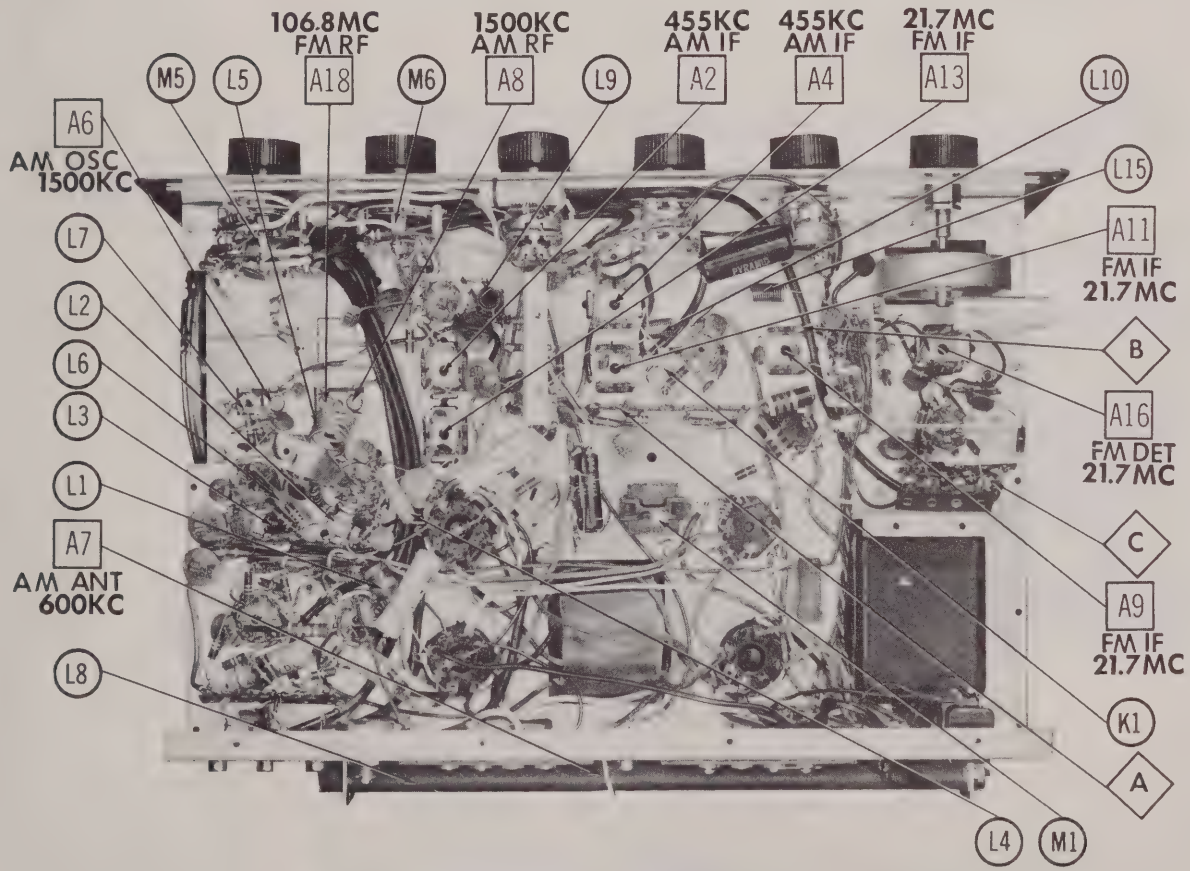


FIG. 2



CHASSIS-TOP VIEW



CHASSIS-BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	FM RF Amp. -Mixer	6BQ7A	
V2	FM Osc. -FM AFC	6U8	
V3	AM Converter	6BE6	
V4	1st IF Amplifier	6BA6	
V5	2nd FM IF Amp. - AM Det. -AVC	6AU6	
V6	3rd FM IF Amp.	6AU6	

ITEM No.	USE	TYPE	NOTES
V7	Ratio Detector	6AL5	
V8	AF Amplifier	12AX7	
V9	AF Amp. -Phase Inv.	12AX7	
V10	Output	6V6GT	
V11	Output	6V6GT	
V12	Rectifier	5Y3GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	CRAFTSMEN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	350	CEX-10	AFHS4-56-05	D0530	FP437	TMQ-95	Q-395	R2324 *
B	■30	300			BR3035	TC77	TD-30-350	MT-4530	
C	▲20	250							
D	100	50							
C2A	40	150	CEX-11	AFH3-10	C0090	FP311.5	TMT-9	T-045	TVA-3451
B	■40	150							
C	▲40	150							
C3	4	25		PRS150V4	BBR4-50	TC30	TD-4-25	MT-0504	TVA-1402

* Non catalog item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	CRAFTSMEN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C5	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C6	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C7	22			NP0-SI 22	TCZ-22	C10Q22C	TCO-22		5TCC-Q22	NP0
C8	4.7			NP0-SI 4.7	TCZ-4R7	C10V47C	TCO-4.7	ZT-5547	5TCCB-V47	
C9	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C10	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C11	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C12	20000			BPD-02	DD-203	BYB6S2	ED-02		5HK-S2	
C13	20000			BPD-02	DD-203	BYB6S2	ED-02		5HK-S2	
C14	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C15	1500		CBX-1							
C16	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C17	4.7			NP0-SI 4.7	TCZ-4R7	C10V47C	TCO-4.7	ZT-5547	5TCCB-V47	NP0
C18	56			N750-SI 56	TCN-56	C10Q56U	TC7-56			N750
C19	1-6		CKX-1		829-6		532-B			
C20	470			BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C21	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CRAFTSMEN PART No.	IRC PART No.	
R6	68Ω			BTS-68	
R7	15Ω			BTS-15	
R8	47K			BTS-47K	
R9	33K			BTS-33K	Note 1
R10	1500Ω			BTS-1500	
R11	1Meg			BTS-1Meg	
R12	10K			BTS-10K	
R13	10K			BTS-10K	
R14	4700Ω			BTS-4700	Note 1
R15	47K			BTS-47K	Note 5
R16	820Ω			BTS-820	Note 2
R17	560Ω			BTS-560	
R18	1Meg			BTS-1Meg	
R19	22K			BTS-22K	
R20	4700Ω			BTS-4700	
R21	1Meg			BTS-1Meg	
R22	1000Ω			BTS-1000	
R23	1000Ω			BTS-1000	
R24	470K			BTS-470K	
R25	100Ω			BTS-100	
R26	1000Ω			BTS-1000	
R27	1000Ω			BTS-1000	
R28	100Ω			BTS-100	
R29	100K			BTS-100K	
R30	1000Ω			BTS-1000	
R31	1000Ω			BTS-1000	
R32	47Ω			BTS-47	
R33	33K			BTS-33K	
R34	1Meg			BTS-1Meg	
R35	1000Ω			BTS-1000	
R36	15K			BTS-15K	
R37	1200Ω			BTS-1200	
R38	15K			BTS-15K	

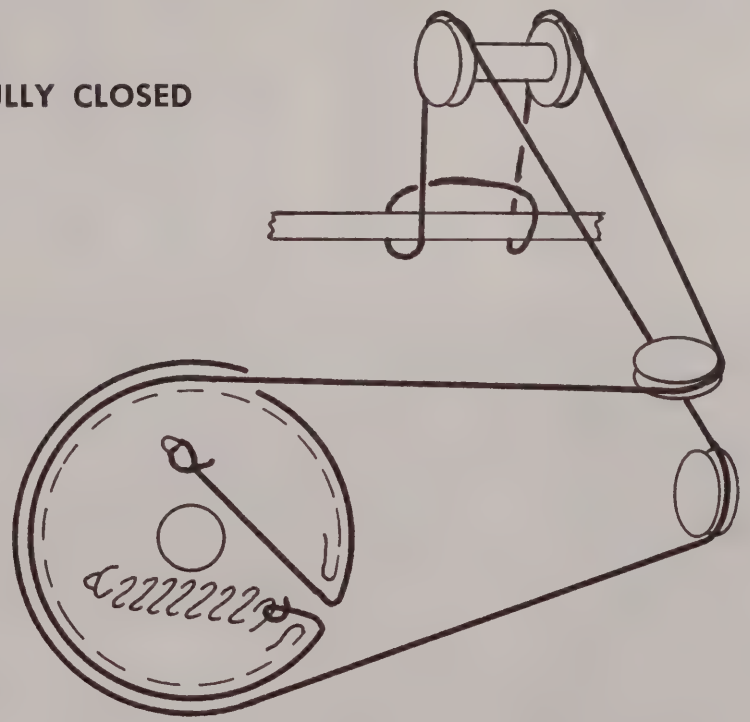
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CRAFTSMEN PART No.	IRC PART No.	
R39	1.5Meg			BTS-1.5Meg	
R40	150K			BTS-150K	
R41	47K			BTS-47K	Note 3
R42	1Meg			BTS-1Meg	
R43	270K			BTS-270K	
R44	1500Ω			BTS-1500	
R45	27K			BTS-27K	
R46	270K			BTS-270K	
R47	820Ω			BTS-820	
R48	220Ω			BTS-220	
R49	150K			BTS-150K	Note 4
R50	470K			BTS-470K	
R51	33K			BTS-33K	
R52	820K			BTS-820K	
R53	390Ω			BTS-390	
R54	820Ω			BTS-820	
R55	270K			BTS-270K	
R56	6800Ω			BTS-6800	
R57	22K			BTS-22K	
R58	22K			BTS-22K	Note 5
R59	12K			BTS-12K	
R60	220K			BTS-220K	
R61	220K			BTS-220K	
R62	470K			BTS-470K	
R63	470K			BTS-470K	
R64	350Ω	5		1 3/4A-350	
R65	33K			BTS-33K	
R66	1800Ω			BTS-1800	
R67	470Ω	2		BTB-470	
R68	470Ω	2		BTB-470	
R69	47Ω			BTS-47	
R70	4.7Ω 5%	1			

Note 1. Some versions may use 1000Ω.
Note 2. Some versions may use 390Ω.
Note 3. Some versions may use 27K.
Note 4. Some versions may use 470K.
Note 5. Not used in early production versions.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	CRAFTSMEN PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .77A	630VCT @ .070A	140VAC @ .048A	5VAC @ 2A	T-28					
			SEC. 4	SEC. 5						
			6.3VAC @ 1.42A	6.3VAC @ 2.56A						

TUNING GANG FULLY CLOSED



DIAL CORD DRIVE

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA CRAFTSMAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C22	10			NP0-SI 10	TCZ-10	C10Q1C	TCO-10	ZT-541	5TCC-Q1	NP0
C23	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C24	47			BPD-000047	DD-470	L10Q47	ED-47	UC-5447	5GA-Q47	
C25	10			BPD-00001	DD-100	L10Q1	ED-10	UC-541	5GA-Q1	
C26	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C27	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C28	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C29	2000			BPD-002	DD-202	BUA10D2	ED-002	DC522	5HK-D2	
C30	1500		CBX-1							
C31	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C32	2000			BPD-002	DD-202	BYA10D2	ED-002	DC522	5HK-D2	
C33	1500		CBX-1							
C34	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C35	22			NP0-SI 22	TCZ-22	C10Q22C	TCO-22		5TCC-Q22	NP0 ①
C36	22			NP0-SI 22	TCZ-22	C10Q22C	TCO-22		5TCC-Q22	NP0 ①
C37	22			NP0-SI 22	TCZ-22	C10Q22C	TCO-22		5TCC-Q22	NP0 ①
C38	22			NP0-SI 22	TCZ-22	C10Q22C	TCO-22		5TCC-Q22	NP0 ①
C39	47			BPD-000047	DD-470	L10Q47	ED-47	UC-5447	5GA-Q47	
C40	2000			BPD-002	DD-202	BYA10D2	ED-002	DC522	5HK-D2	
C41	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C42	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	②
C43	2000			BPD-002	DD-202	BYA10D2	ED-002	DC522	5HK-D2	
C44	330			BPD-00033	DD-331	L10T33	ED-330	UC-5333	5GA-T33	
C45	330			BPD-00033	DD-331	L10T33	ED-330	UC-5333	5GA-T33	
C46	330			BPD-00033	DD-331	L10T33	ED-330	UC-5333	5GA-T33	
C47	2000			BPD-002	DD-202	BYA10D2	ED-002	DC521	5HK-D2	
C48	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C49	.15	200		P288N-15		CUB2P15		GEM-2015	2TM-P15	
C50	3300			BPD-0033	D6-332	BYA10D33	ED-0033	UC-5233	5GA-D33	
C51	.047	400		BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	
C52	3300			BPD-0033	D6-332	BYA10D33	ED-0033	UC-5233	5GA-D33	
C53	2000			BPD-002	DD-202	BYA10D2	ED-002	DC522	5HK-D2	
C54	270			BPD-00027	DD-271	L10T27	ED-270	UC-5327	5GA-T27	
C55	470			BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C56	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C57	470			BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C58	100			BPD-0001	DD-101	L10T1	ED-100	UC-531	5GA-T1	
C59	20000			BPD-02	DD-203	BYB6S2	ED-02		5HK-S2	
C60	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C61	3300			BPD-0033	D6-332	BYA10D33	ED-0033	UC-5233	5GA-D33	①
C62	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C63	200			BPD-0002	DD-201	L10T2	ED-200	UC-532	5GA-T1	
C64	.033	200		P288N-033	DF-303	CUB6S33		GEM-4133	6TM-S33	
C65	.047	400		BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	
C66	.047	400		BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	
C67	.047	400		BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	
C68	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C69	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C70	22			NPO-SI22	TCZ-22	C10Q22C	TCO-22	ZT-5422	5TCC-Q22	NPO ①

① Not used in some versions
② Some versions use a 1500MMF feed thru type unit in this application (Part #CBX-1)

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA CRAFTSMEN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	½	P-26 ①	C1-70-S		Q18-137XX	UDT289	Contoured Loudness; Tap ⓐ 250K & 400K
B	Shaft			Not Req.		Not Req.	Not Req.	
C	Switch			KB-1		76-1	US-26	
R2A	50K	½	P-25			Q11-123		Treble
B	5000Ω	½				M11-114		Treble
R3A	20K	½	②					Bass, Tap ⓐ 2000Ω
B	1Meg	½						Bass
R4A	1Meg	½	P-11	AB-69	A47-1Meg-S	Q11-137	SU-54	Level Set
B	Shaft			AK-1	FKS-1/4	RQ	Not Req.	
R5	150Ω	2	P-5					Hum Balance (Wire Wound)

① Capacitor-Resistor Unit Furnished With Original Control.
② In Some Versions R3A is 100K & R3B is 1Meg (Part #P-24).

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA CRAFTSMEN PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	8000Ω CT	16Ω tapped ⓐ 8Ω, 4Ω	T-27				22S66 ①		① Use Orig. Shield

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA CRAFTSMEN PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	IF Trap	T-40				3 Microhenries; Wound On 18 MMFCap.
L2	RF Choke	53A043	19-1000	BC-561	4602	1 Microhenry; IRC Part #CLA
L3	Fil. Choke	53A051	19-1000	TV-189	4602	.75 Microhenry
L4	RF Choke	53A046		BC-564		3.3 Microhenries; IRC Part #CLA
L5	FM RF Coil	T-36				
L6	RF Choke	53A046		BC-564		3.3 Microhenries; IRC Part #CLA
L7	FM Osc. Coil	T-37				
L8	Loop Stick	T-35		BC-419		
L9	AM Osc. Coil	T-38	14-1055	BC-393	70-osc	
L10	Fil. Choke	53A051	19-1000	TV-189	4602	.75 Microhenry
L11	1st FM IF	T-31				
L12	1st AM IF	T-33	16-6758	BC-352	12-C1	
L13	2nd FM IF	T-31				
L14	2nd AM IF	T-34	16-6758	BC-353	12-C2	
L15	Fil. Choke	53A051	19-1000	TV-189	4602	.75 Microhenry
L16	3rd FM IF	T-31				
L17	Ratio Det.	T-32				

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	CRAFTSMEN PART No.	REPLACEMENT DATA	
K1	Det. RF Filter	150MMF, 150MMF, 47K	CCX-1	Aerovox	PA-98
				Centralab	PC-51
				Cornell-Dubilier	111TM2
				Erie	1403-02
				Sprague	D-2

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA CRAFTSMEN PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	NOTES
M1	.048A	①	1068	6RS065Q	8S75		

① Early versions use a full wave bridge type unit (Part #CR-12).

MISCELLANEOUS

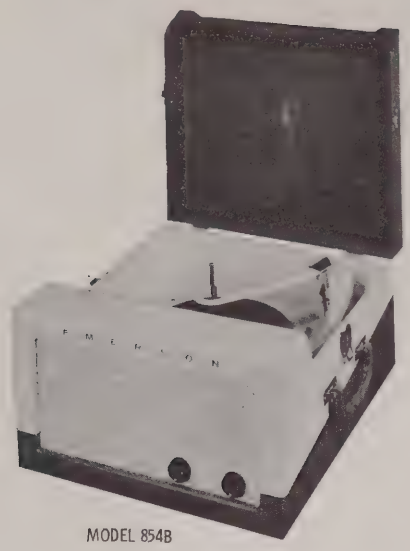
ITEM No.	PART NAME	CRAFTSMEN PART No.	NOTES
M2	Dial Light		#51
M3	Dial Light		#51
M4	Tuning Cap.	CAX-6	4 Gang (AM Sections: Ant. 25-567MMF, Osc. 29-90MMF)
M5	Switch	SW-39	Function
M6	Switch	SW-37	Roll-Off

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	N-12	Push-On Type
Knob	N-13	Set Screw Type
Dial Glass	IN-68	
Dial Pointer	82A009	

EMERSON
MODELS 845B, 854A, B (Ch. 120321B)



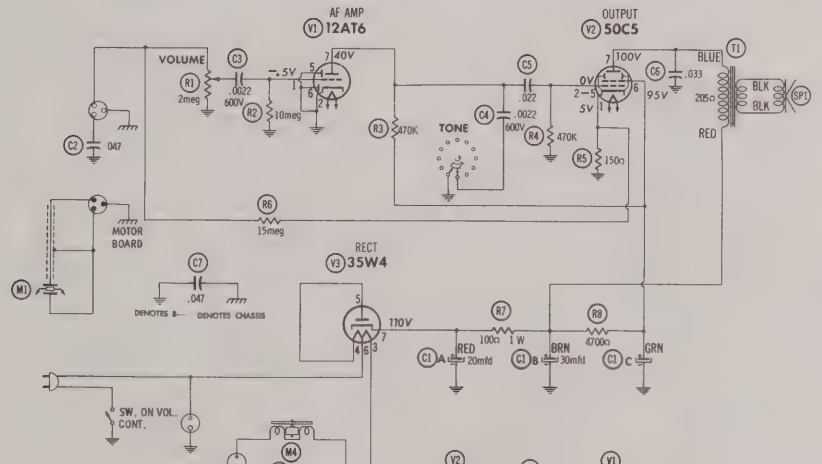
MODEL 854B

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

EMERSON
MODELS 845B, 854A, B (Ch. 120321B)

TRADE NAME	Emerson Models 845B, 854A, 854B (Ch. 120321B)
MANUFACTURER	Emerson Radio & Phono Corp., 14th & Coles Sts., Jersey City 2, N. J.
TYPE SET	AC Operated Phono Amplifier With 3 Speed Automatic Record Changer
TUBES (Three)	Types 12AT6 AF Amplifier, 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC (50~ for Model 854A, 60N for Models 845B, 854B)
RATING	.25 Amp. @ 117 Volts AC (26 Watts without Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER PART #819103 (USED IN MODEL 854A) OR 819104 (USED IN MODELS 845B, 854B) - SEE SIMILAR V-M MODEL 954B - PHOTOFACT SET 302 FOLDER 12 OR RECORD CHANGER MANUAL CM-8



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12AT6	10Meg	0Ω	0Ω	15Ω	0Ω	0Ω	†475K
V2	50C5	150Ω	470K	150Ω	200Ω	470K	†4800Ω	†300Ω
V3	35W4	TP	TP	200Ω	220Ω	220Ω	215Ω	30K

† MEASURED FROM PIN 7 OF V3
TP TIE POINT

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amplifier	12AT6	
V2	Output	50C5	
V3	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	EMERSON PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	20	150	925246	PRS150V40	BBRT43215	TCT3113	TDLT-3	FMT-312	TVA-3448
B	30	150		3020					
C	30	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	EMERSON PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.047	400	923554	BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	
C3	.0022	600	923723	BPD-0022	D6-222	CUB6D22	ED-0022	GEM-6222	6TM-D22	
C4	.0022	600	923723	BPD-0022	D6-222	CUB6D22	ED-0022	GEM-6222	6TM-D22	
C5	.022	400	922524	BPD-02	DD-203	CUB4S22	ED-02	GEM-4122	4TM-S22	
C6	.033	400	922534	BPD-03	DF-303	CUB6S33		GEM-6133	6TM-S33	
C7	.047	400	923554	BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	EMERSON PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	2Meg	½	390239	B-75	A47-2Meg-S	Q11-139	U56	Volume
B	Shaft			Not req.	KSS-3	Not req.	Not req.	
C	Switch			KB-1	SWE-12	76-1	US-26	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	EMERSON PART No.	IRC PART No.	
R2	10Meg		351452	BTS-10Meg	
R3	470K		351132	BTS-470K	
R4	470K		351132	BTS-470K	
R5	150Ω		340292	BTS-150	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	EMERSON PART No.	IRC PART No.	
R6	15Meg		391492	BTS-15Meg	
R7	100Ω	1	370252	BTA-100	
R8	4700Ω		350652	BTS-4700	
R9	133Ω 5%	5	394144		

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	EMERSON PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2000Ω	3-4Ω	734133	Z1101 ①	A-2928 ①	A-3332 ①	26S58	S-2X ①	① Drill new mounting hole.

SPEAKER

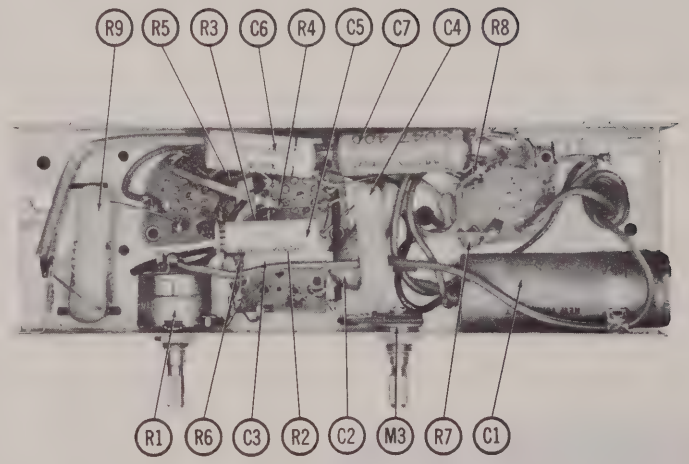
ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	EMERSON PART No.	QUAM PART No.	
SP1	5½"	PM	3-4Ω	180147	52A1	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	EMERSON PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	MOUNT	
M1	961789	55T	GD	56	PT-2	

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

CHASSIS—BOTTOM VIEW



PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	EMERSON PART No.	JENSEN PART No.	WALCO PART No.	
M2	961790	† JPS-35 or † JP-35 or †♦ JP-35SD or ♦ JP-35D	† W-35TPA or † W-35TPS or †♦ W-35DS or ♦ W-35TPD	† Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	EMERSON PART No.	NOTES
M3	Switch	510034	Tone
M4	Phono Motor	961800	

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	460533B	Tone
Knob	460533A	ON-OFF-Volume
Cabinet	140762D	Saddle Tan & Cream, Models 854A, B
Cabinet	140762E	Cream & Saddle Tan, Models 854A, B
Cabinet	140762	Green, Model 845B
Cabinet	140762A	Sun Tan, Model 845B
Cabinet	140762B	Charcoal Gray, Model 845B

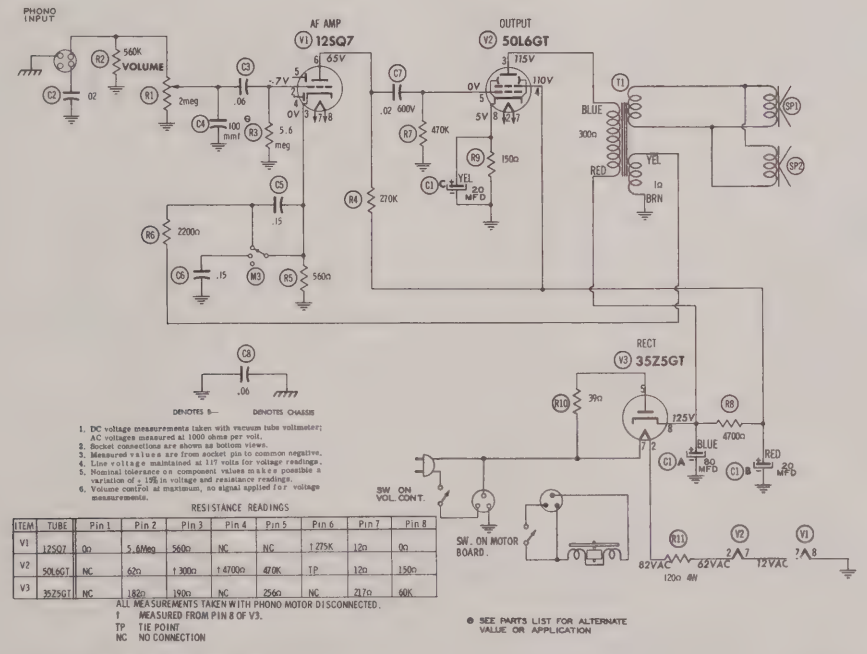
FIRESTONE MODELS 4-A-145, 4-A-146 (Codes 389-5-3146, 389-5-3149, 389-6-3146A, 389-6-3149A)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

FIRESTONE MODELS 4-A-145, 4-A-146 (Codes 389-5-3146, 389-5-3149, 389-6-3146A, 389-6-3149A)

TRADE NAME	Firestone Models 4-A-145 (Codes 389-5-3146, 389-6-3146A) (Manual Record Player), 4-A-146 (Codes 389-5-3149, 389-6-3149A) (Automatic Record Changer)
SUPPLIER	Firestone Tire & Rubber Co., 1200 Firestone Parkway, Akron, Ohio
TYPE SET	AC Operated Phono Amplifier
TUBES (Three)	Types 12SQ7 AF Amplifier, 50L6GT Output, 35Z5GT Rectifier
POWER SUPPLY	105-125 Volts AC - 60 Cycles RATING .22 Amp. @ 117 Volts AC

FOR SERVICE INFORMATION ON 3 SPEED AUTOMATIC RECORD CHANGER PART #11773 - SEE SIMILAR V-M MODEL 950 - PHOTOFACT SET 216 FOLDER 11 OR RECORD CHANGER MANUAL CM-5.
FOR SERVICE INFORMATION ON 4 SPEED AUTOMATIC RECORD CHANGER PART #12165 - SEE SIMILAR V-M MODEL 1200A - PHOTOFACT SET 353 FOLDER 16.



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V1	12SQ7	0Ω	5.6Meg	560Ω	NC	NC	1275K	12Ω	0Ω
V2	50L6GT	NC	62Ω	1300Ω	1470Ω	470K	TP	12Ω	150Ω
V3	35Z5GT	NC	182Ω	190Ω	NC	256Ω	NC	217Ω	60K

ALL MEASUREMENTS TAKEN WITH PHONO MOTOR DISCONNECTED.
1 MEASURED FROM PIN 8 OF V3.
TP TIE POINT
NC NO CONNECTION

@ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amplifier	12SQ7	
V2	Output	50L6GT	

ITEM No.	USE	TYPE	NOTES
V3	Rectifier	35Z5GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	FIRESTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	80	150	11504	PRS150/25V	BBRT8415C	TCT3117	TDLT-7	FMT-333	R2199*
B	20	150	(Note 1)	8040/20					
C	20	25							

* Non catalog item.

Note 1. Some versions may use Part #12145

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	FIRESTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.02	200	11508	BPD-02	DD-203	CUB2S2	817-02	GEM-412	2TM-S2	
C3	.06	200	11509	P288N-06		CUB6S6		GEM-616	6TM-S6	
C4	100		11534	BPD-0001	DD-101	L10T1	801-101	UC-531	5GA-T1	
C5	.15	200	11510	P288N-15		CUB2P15		GEM-4015	2TM-P15	
C6	.15	200	11510	P288N-15		CUB2P15		GEM-4015	2TM-P15	
C7	.02	600	11508	BPD-02	DD-203	CUB6S2	817-02	GEM-612	6TM-S2	
C8	.06	200	11509	P288N-06		CUB6S6		GEM-616	6TM-S6	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	FIRESTONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	2Meg	½	11512					Volume & Switch (Note 1)

Note 1. Part #12017 (without sw) used in Model 4-A-146 (Code 389-6-3149A)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	FIRESTONE PART No.	IRC PART No.	
R2	560K		8842	BTS-560K	
R3	5.6Meg		10301	BTS-5.6Meg	Note 1
R4	270K		8841	BTS-270K	
R5	560Ω 5%		10921	BTS-560 5%	
R6	2200Ω		10986	BTS-2200	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	FIRESTONE PART No.	IRC PART No.	
R7	470K		10305	BTS-470K	
R8	4700Ω		10429	BTS-4700	
R9	150Ω		9897	BTS-150	
R10	39Ω		10428	BTS-39	
R11	120Ω	4	10306	1 3/4A-125	

Note 1. 1.2Meg (Part #9893) used in Model 4-A-145

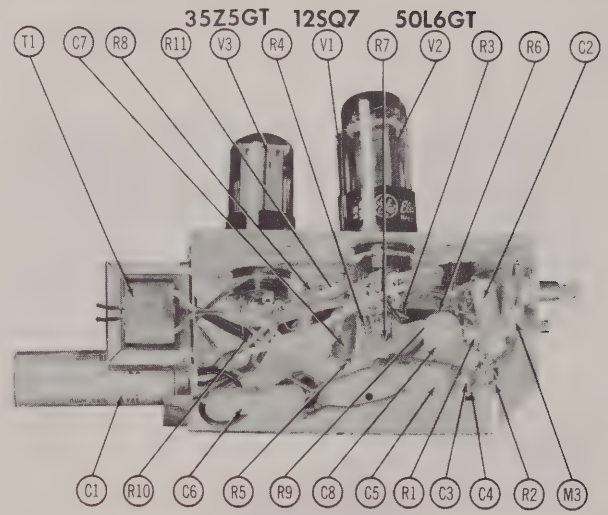
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	FIRESTONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2300Ω	1.4Ω SEC. 2 1Ω RES.	11503						

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	FIRESTONE PART No.	QUAM PART No.	
SP1	5 1/4"	PM	2.7Ω	10901	52A1	① Used in Model 4-A-146
SP2	6"	PM	3.1Ω	11505 ①	6A1	② Used in Model 4-A-145
	4"	PM	3.1Ω	11792 ②	4A07	

CHASSIS—BOTTOM VIEW



PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	FIRESTONE PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	MOUNT	
M1	11406 ① or 12132 ② 11826 ③	55-T *P66T 51-2	GD-J G-AG-J	56 *24H60	PT-2	① Model 4-A-146. * Complete tone arm & cartridge ass'y ② Model 4-A-145 Code 389-6-3146A. ③ Model 4-A-145 Code 389-5-3146.

ASTATIC NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	FIRESTONE PART No.	JENSEN PART No.	WALCO PART No.	
M2	11407 ①	*S-67 or †S-66 or ♦†S-66SD or ♦S-66D	†W-75TPS or ♦†W-75DS or ♦W-75TPD	* Metal † Jewel ♦ Diamond ① Model 4-A-146. ② Model 4-A-145 Code 389-6-3146A. ③ Model 4-A-145 Code 389-5-3146.
	12133 ②	*A-72 or †A-71 or ♦†A-71SD or ♦A-71D	*W-8TPA or †W-8TPS or ♦†W-8DS or ♦W-8TPD	
	11827 ③	†W-362	*W-23AGA	

MISCELLANEOUS

ITEM No.	PART NAME	FIRESTONE PART No.	NOTES
M3	Switch	11513	Tone (Rotary-Wafer Type, SP-3 Position)

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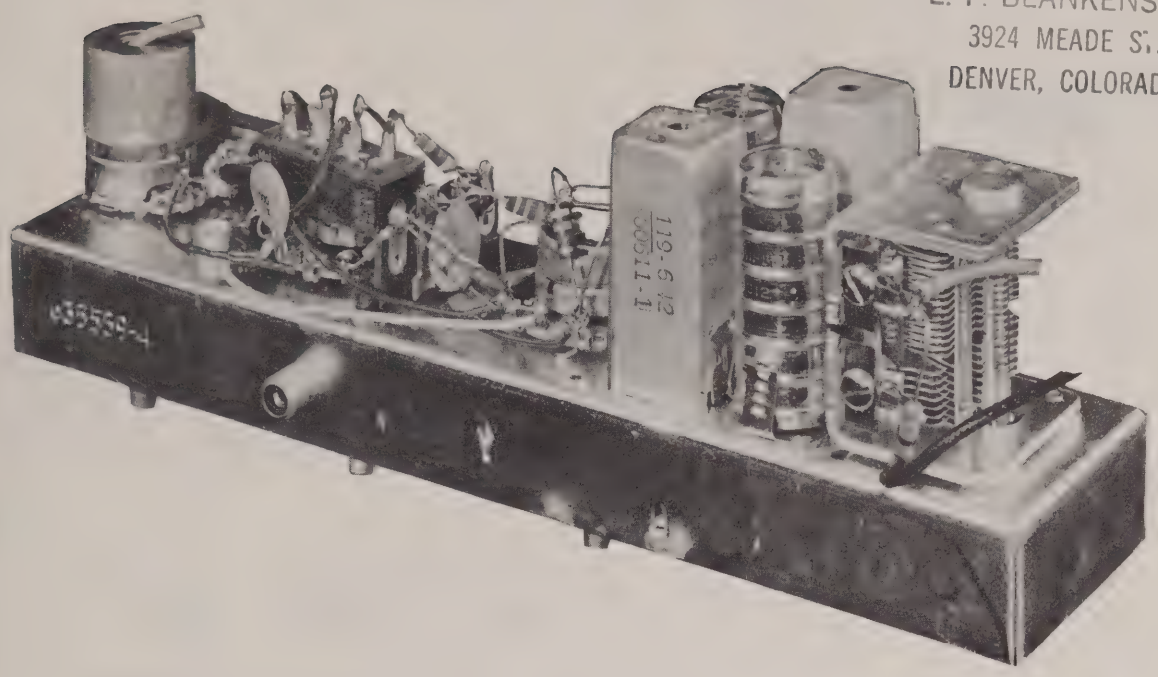

MAGNAVOX
CHASSIS CR-743

TRADE NAME	Magnavox Chassis CR-743
MANUFACTURER	Magnavox Co., 2131 Bueter Rd., Fort Wayne 4, Indiana
TYPE SET	Externally Powered AM Tuner
TUBES (Two)	Types 6BE6 Converter, 6BZ6 IF Amplifier
POWER SUPPLY	Externally Powered
TUNING RANGE—BROADCAST	540KC-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in the same relative position to chassis as when the receiver is in cabinet.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 7 (grid) of 6BE6 (V1). Low side to chassis.	455KC (400∿ Mod.)	Quiet point near mid-range.	DC probe to Ⓐ. Common to chassis.	A1, A2, A3, A4	Adjust for maximum output.
2.	"	"	1620KC	Tuning gang fully open.	"	A5	"
3.		Loop	1400KC	Tune to 1400KC signal.	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4.		"	600KC	600KC	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. If necessary, adjust movable part of rod antenna for maximum output. Repeat steps 3 & 4.

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PARTS LIST AND DESCRIPTIONS

MAGNAVOX
CHASSIS CR-743

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	6BE6	

ITEM No.	USE	TYPE	NOTES
V2	IF Amplifier	6BZ6	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MAGNAVOX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1	.1	200	250202-13	P288N-1	DF-104	CUB2P1		GEM-201	2TM-P1	
C2	47		250218-17	BPD-000047	DD-470	L10Q47	ED-47	UC-5447	5GA-Q47	
C3	5000		250175-1	BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C4	5000		250175-1	BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C5	1500		250218-18	BPD-0015	DD-152	BYA10D15	ED-0015	DC5215	5HK-D15	
C6	10000		250218-19	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C7	470		250218-15	BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C8	68		250218-7	BPD-000068	DD-680	L10Q68	ED-68	UC-5468	5GA-Q68	
C9	2000		250218-20	BPD-002	DD-202	BYA10D2	ED-002	DC522	5HK-D2	
C10	1000		250218-8	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C11	47		250218-17	BPD-000047	DD-470	L10Q47	ED-47	UC-5447	5GA-Q47	
C12	1000		250218-8	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C13	220		250218-5	BPD-00022	DD-221	L10T22	ED-220	UC-5322	5GA-T22	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESIST-ANCE	WATTS	MAGNAVOX PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	3.3Meg	½	220140-3				UDT-303	Volume, Taps @ 300K, 2Meg
B	Shaft							
C	Switch						US-28	TV
R2A	3.3Meg	½	220119-4					Bass
B	Switch							Radio-Phono
R3A	1Meg	½	220123-26	B-69	A47-1Meg-S	Q11-137	U54	Treble
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
C	Switch			KB-1	SWE-12	76-1	US-26	
D	Cover			KB-5				

RESISTORS

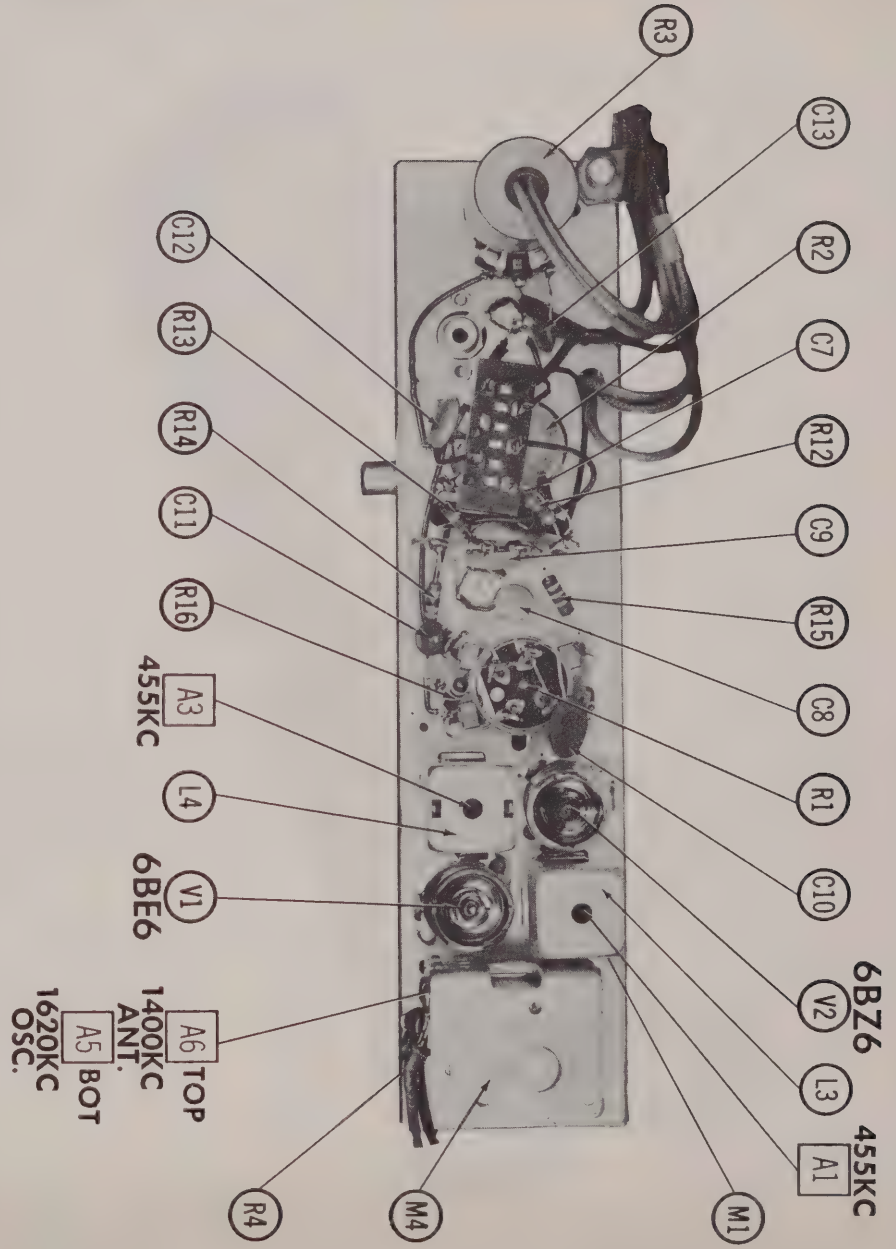
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MAGNAVOX PART No.	IRC PART No.	
R4	100Ω		230104-50	BTS-100	Note 1
R5	22K		230104-78	BTS-22K	
R6	15K		230104-76	BTS-15K	
R7	3300Ω		230104-68	BTS-3300	
R8	180Ω		230104-53	BTS-180	
R9	3.3Meg		230104-104	BTS-3.3Meg	
R10	47K		230104-82	BTS-47K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MAGNAVOX PART No.	IRC PART No.	
R11	220K		230104-90	BTS-220K	
R12	4.7Meg		230104-106	BTS-4.7Meg	
R13	220K		230104-90	BTS-220K	
R14	3.3Meg		230104-104	BTS-3.3Meg	
R15	68K		230104-84	BTS-68K	
R16	4700Ω		230104-70	BTS-4700	

Note 1. Not used in some versions.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		MAGNAVOX PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Stick	360705-1				
L2	Osc. Coil	360702-1				
L3	Input IF	360611-1	16-6758	BC-352	12-C1	
L4	Output IF	360703-1				

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	MAGNAVOX PART No.	REPLACEMENT DATA
K1	Diode RF Filter	100MMF, 100MMF, 47K	250170-1	Aerovox PA-97-1 Centralab PC-50 Cornell Dubilier 111TM1 Erie 1403-01 Sprague D-1

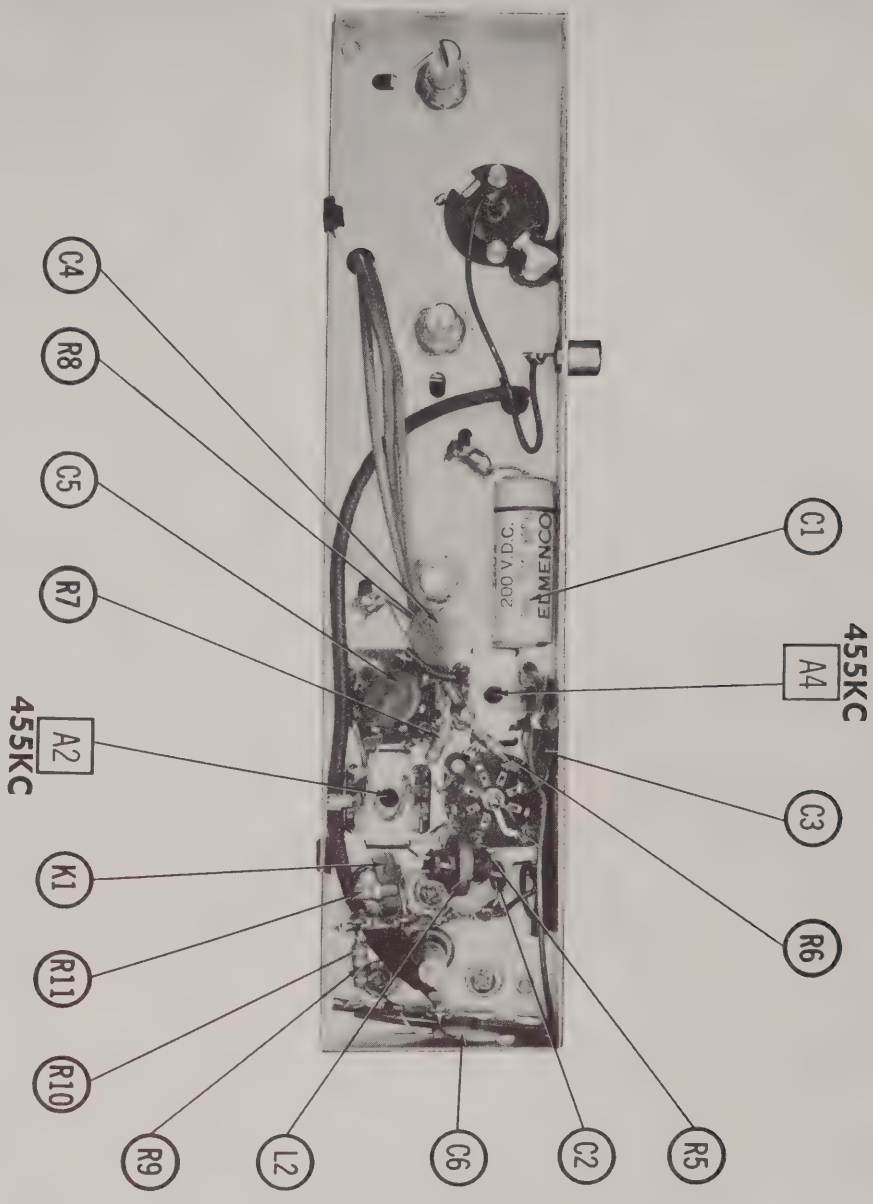
CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		MAGNAVOX PART No.	CBS PART No.	SYLVANIA PART No.	
M1	1N34A	530049-1	1N34A	1N34A	Audio Det. (Pigtail)

MISCELLANEOUS

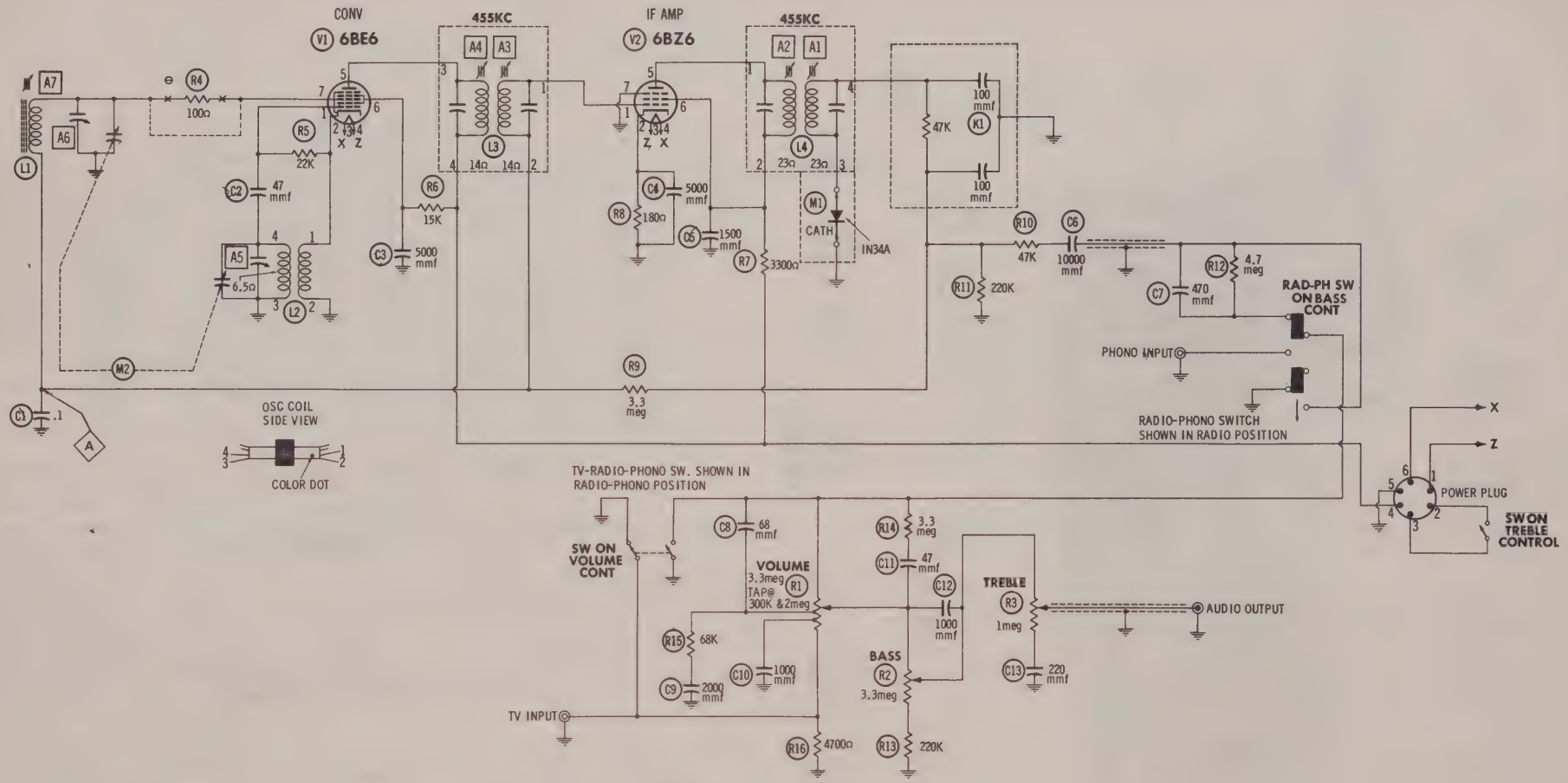
ITEM No.	PART NAME	MAGNAVOX PART No.	NOTES
M2	Tuning gang	260139-1	2 Gang (ANT. 23-390MMF, Osc. 15-105MMF)

CHASSIS—BOTTOM VIEW



MAGNAVOX
CHASSIS CR-743

MAGNAVOX
CHASSIS CR-743



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	6BE6	22K	.6Ω	*0Ω	*1.4Ω	†14Ω	†15K	3.5Meg
V2	6BZ6	3.5Meg	180Ω	*1.4Ω	*0Ω	†3300Ω	†3300Ω	0Ω

† MEASURED FROM PIN 4 OF POWER PLUG.
* MEASURED FROM PIN 6 OF POWER PLUG.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

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MAGNAVOX CHASSIS U73-01AA, U73-02AA, V73-01AA, V73-02AA (73 Series)

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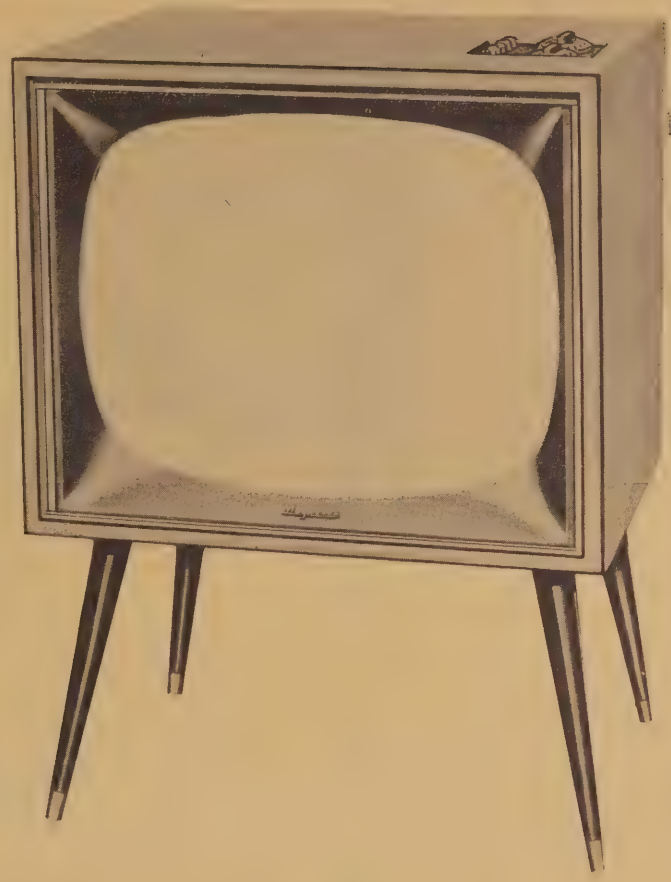

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MAGNAVOX CHASSIS U73-01AA, U73-02AA, V73-01AA, V73-02AA (73 Series)

TRADE NAME	Magnavox Chassis U73-01AA, U73-02AA, V73-01AA, V73-02AA
MANUFACTURER	Magnavox Co., 2131 Bueter Road, Fort Wayne 4, Indiana
TYPE SET	Television Receiver
TUBES	Seventeen
POWER SUPPLY	110-120 Volts AC, 60 Cycle RATING 145 Watts, 1.2 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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CAUTION NOTE

ONE SIDE OF AC LINE CONNECTED TO CHASSIS
Care should be exercised when connecting test equipment or physically contacting the chassis.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF oscillator is possible by removing the channel selector and fine tuning knobs. Set the fine tuning at the center of its range. The adjustments are accessible, one at a time, as the channel selector is rotated. Adjust for best picture and sound.

FOCUS

The focus may be varied by the position of a strap on the base of the picture tube. The strap can be connected between pins 6 and 10 or 6 and 1. Readjust the ion trap for the best focus consistent with maximum brightness.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

The horizontal frequency coil is used as the horizontal hold control. Adjust the horizontal hold until the picture synchronizes horizontally. (For location, see tube placement chart).

FUSES

A 7.5Ω resistor (R87) is used for LV power supply protection. (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

MAGNAVOX CHASSIS U73-01AA, U73-02AA, V73-01AA, V73-02AA (73 Series)

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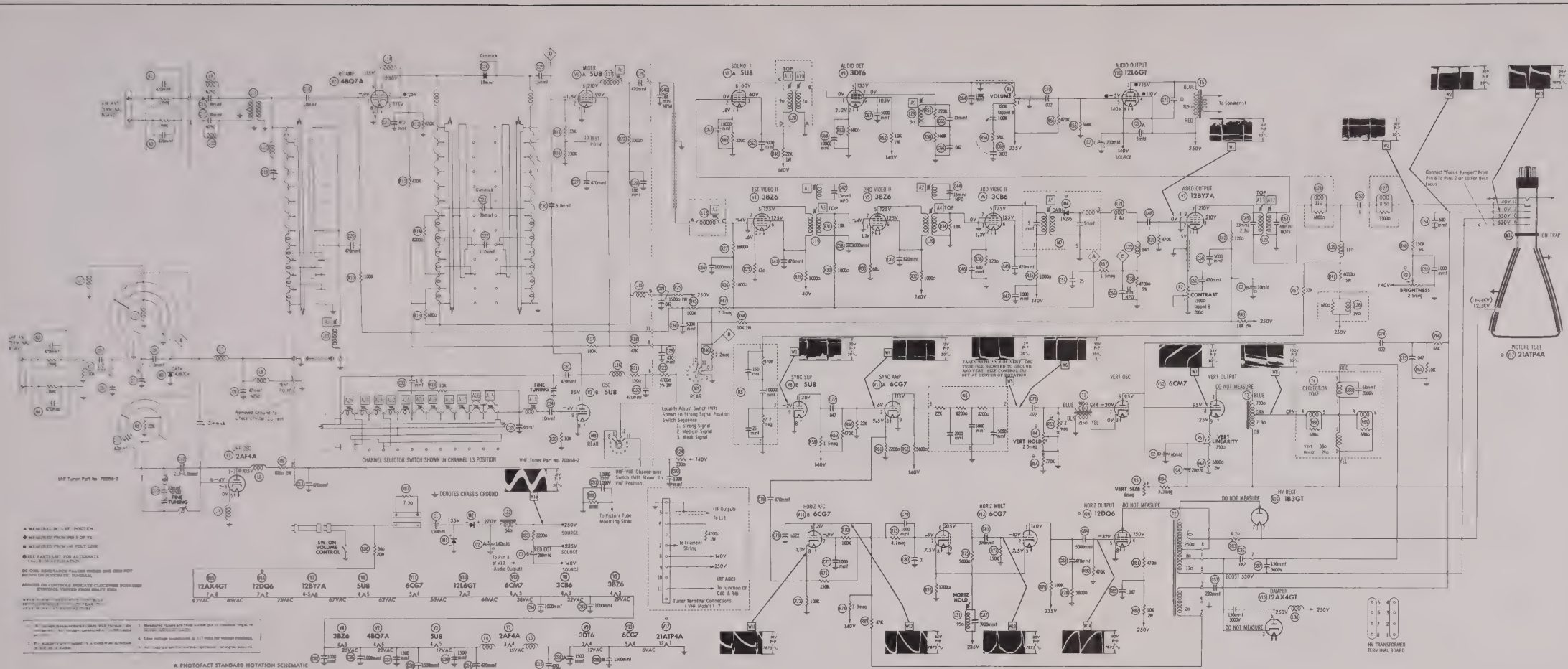
G911R

DATE 9-57 SET 369 FOLDER 12



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MAGNAVOX CHASSIS U73-01AA, U73-02AA, V73-01AA, V73-02AA (73 Series)

TUBE PLACEMENT CHART

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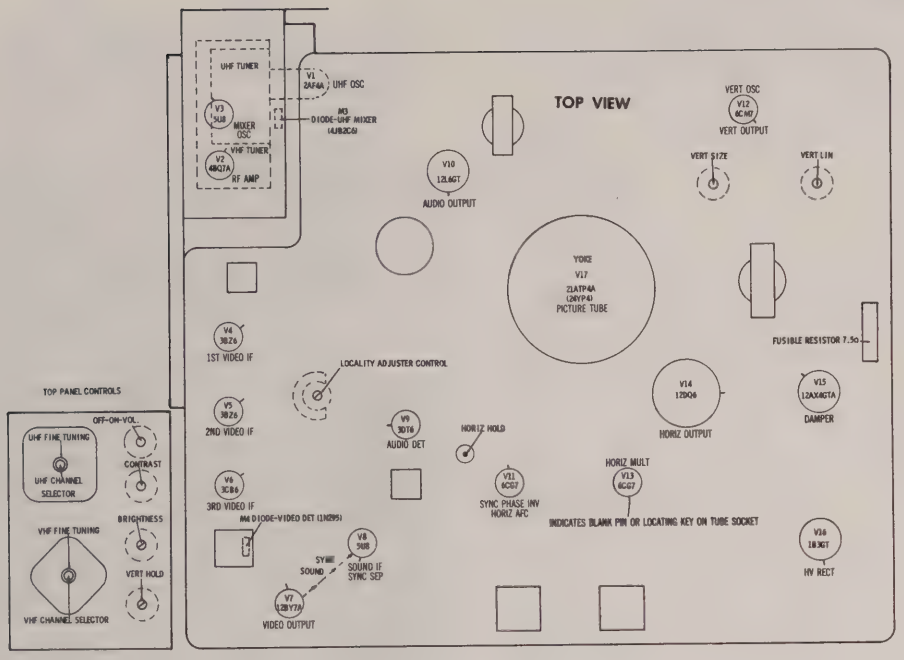


TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

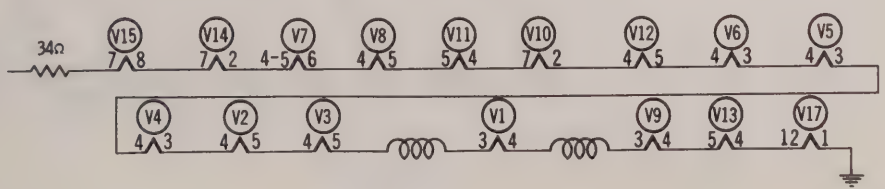
POWER SUPPLY FAILURE
No raster, no sound - Fusible Resistor (R87), Rectifier (M1, M2)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V4, V5, V6, Diode (M4), V7, V10
No pic, no sound, has snow - V2, V3 (V1 UHF only)
No pic, has sound, has raster - V7, V17
Has pic, no sound - V8, V9, V10

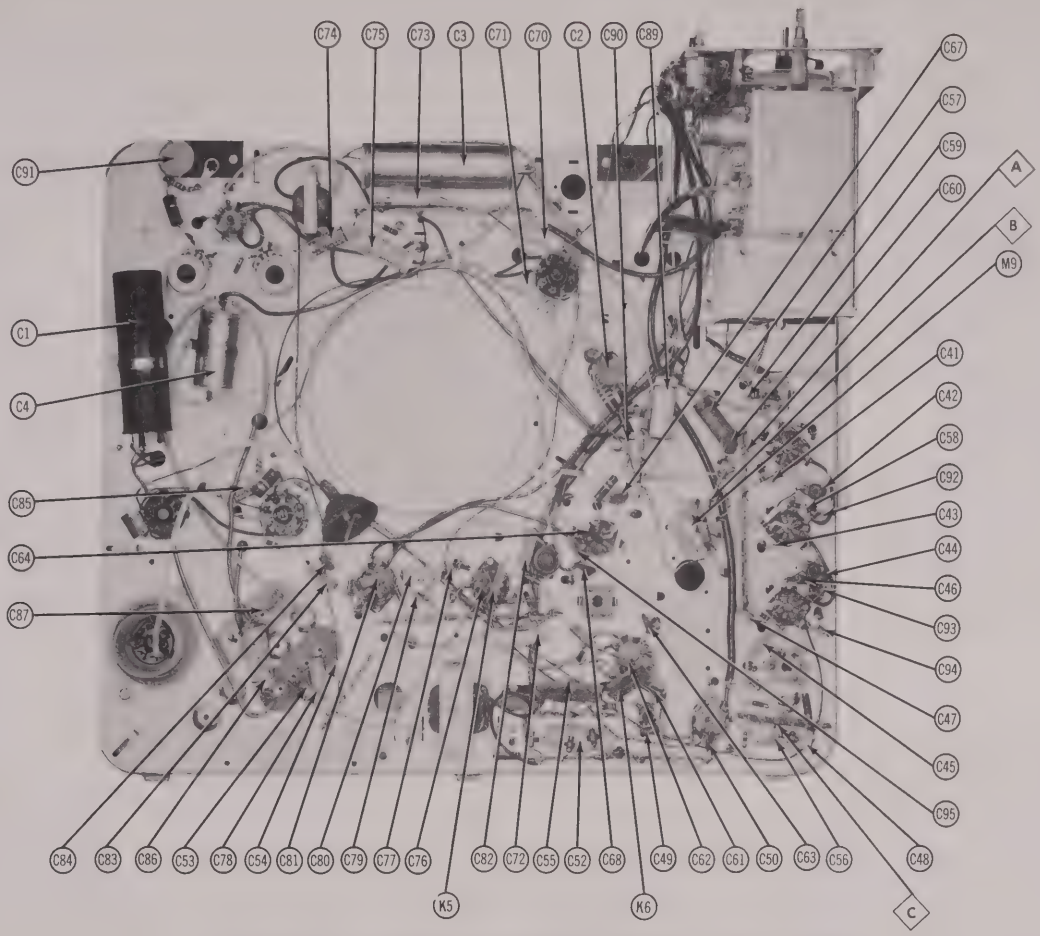
SYNC FAILURE
No vert. sync - V8, V11, V10
No horiz. sync - V8, V11, V10
No vert. or horiz. sync - V8, V11, V10

SWEEP FAILURE
No raster, has sound - V11, V13, V14, V15, V16, V17
No vertical deflection - V12
Poor vert. linearity or foldover - V12
Poor horiz. linearity or foldover - V13, V14, V15
Narrow picture - V13, V14, V15, M1, M2
Vert. off freq. - V12
Horiz. off freq. - V13

This receiver employs tubes used in a series filament network, an open filament in any tube in the series will cause the set to be inoperative. (See circuit below).



MAGNAVOX CHASSIS U73-01AA, U73-02AA, V73-01AA, V73-02AA (73 Series)



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CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

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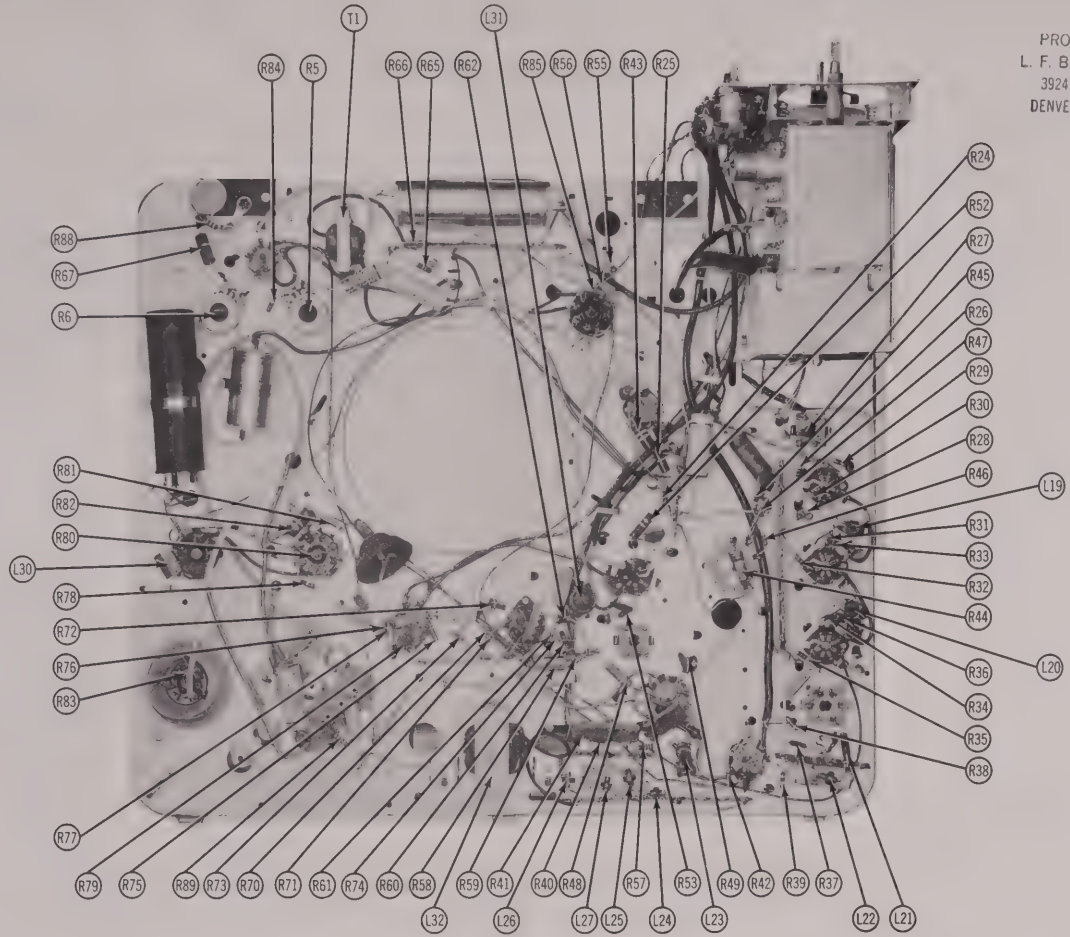


CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
Allow a 20 minute warm-up period for the receiver and test equipment.
The High Voltage lead should be securely taped and kept away from the chassis.

VIDEO IF ALIGNMENT

Set "Locality Adjust" switch to strong position.
Turn contrast control fully counter clockwise.
Connect the negative lead of a 3 volt bias supply to point Ⓐ. Positive to chassis.
Connect the negative lead of a 1.5 volt bias supply to point Ⓑ. Positive to chassis.
Connect the synchronized sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	50Ω Carbon Resistor	High side to pin 1 (grid) of 3BZ6 (V4). Low side to chassis.	43.0MC (10MC Swp)	47.25MC	Any non-intefering channel	Vert. Amp. thru 15K to point Ⓒ. Low side to chassis.	A1	Adjust to place marker in center of trap notch as in Fig. 1.
2.	"	"	"	41.25MC	"	"	A2	"
3.	"	"	"	42.75MC	"	"	A3, A4	Set generator output for 4 volts peak to peak on scope. Adjust for response curve similar to Fig. 2 with markers positioned as shown. Recheck steps 1 and 2.
4.	"	High side to point Ⓓ. Low side to chassis.	"	41.25MC 42.75MC 43.0MC 45.0MC 45.75MC 47.25MC	"	"	A6, A7	Adjust for response similar to Fig. 3 with markers as indicated.
5.	1000Ω	High side to point Ⓔ. Low side to tuner chassis.	"	"	UHF	"	A8	Adjust for maximum gain and MINIMUM tilt of curve similar to Fig. 3.

SOUND IF ALIGNMENT

Turn the set on and tune in a strong TV signal. Adjust A9 for maximum sound output and MINIMUM distortion.
Reduce the signal strength, by removing the antenna connections or connecting a variable attenuator between the antenna and antenna terminals, so that with volume control set at maximum, the sound signal is barely audible. Adjust A10 for MINIMUM distortion and clearest sound.
With the same weak signal input, adjust A11 and A12 for MINIMUM noise and clearest sound.
Reduce signal further until noise is present in the sound and retouch A10 for MINIMUM noise and clearest sound.

4.5MC TRAP ALIGNMENT

Turn the set on and adjust A13 for MINIMUM 4.5MC beat interference in picture.

VHF OSCILLATOR ALIGNMENT

Connect bias as under "Video IF Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Set the fine tuning control to the center of its range.
Use only enough sweep generator output to provide usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Fig. 4	Across antenna terminals thru balancing network (Fig. 4).	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 47K to point Ⓒ. Low side to chassis.	A14	Adjust to place sound marker in trap notch as in Fig. 5. Video marker should fall at 50%. Some sets may not have a slug for channel 12.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A15	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A16	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A17	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A18	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A19	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A20	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A21	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A22	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A23	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A24	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A25	

UHF TUNER AND VHF RF AND MIXER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

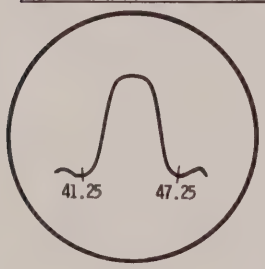


FIG. 1

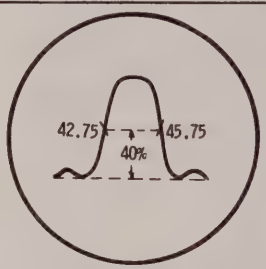


FIG. 2

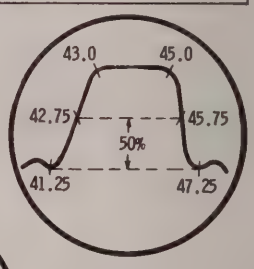


FIG. 3

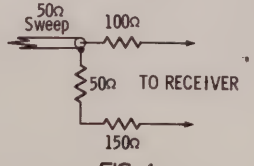


FIG. 4

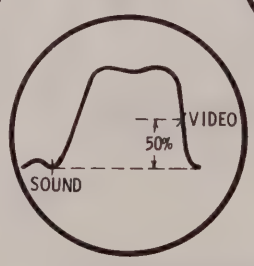


FIG. 5

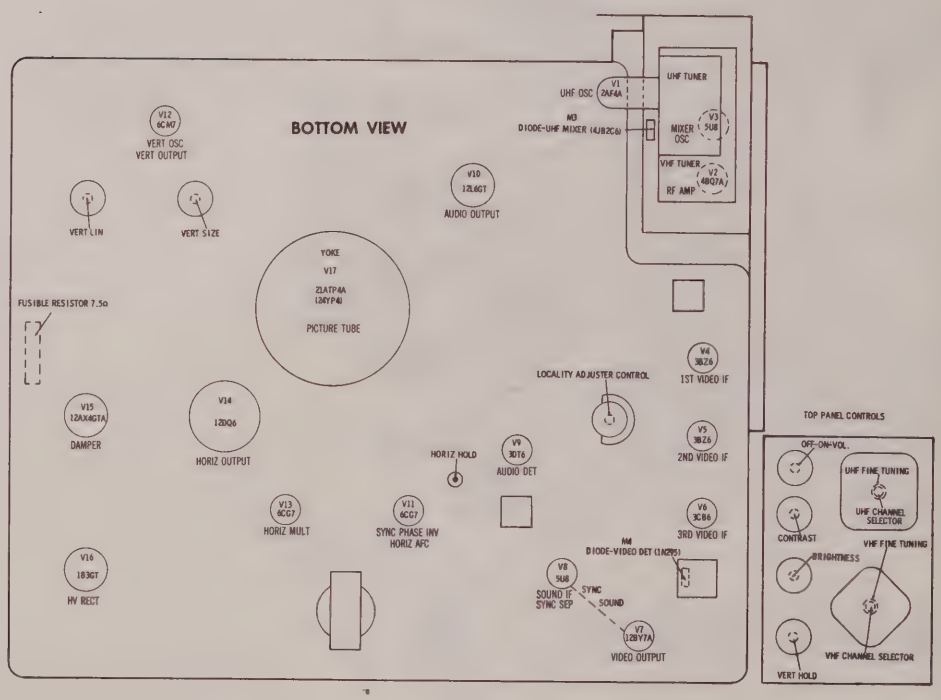
PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CHASSIS TOP VIEW

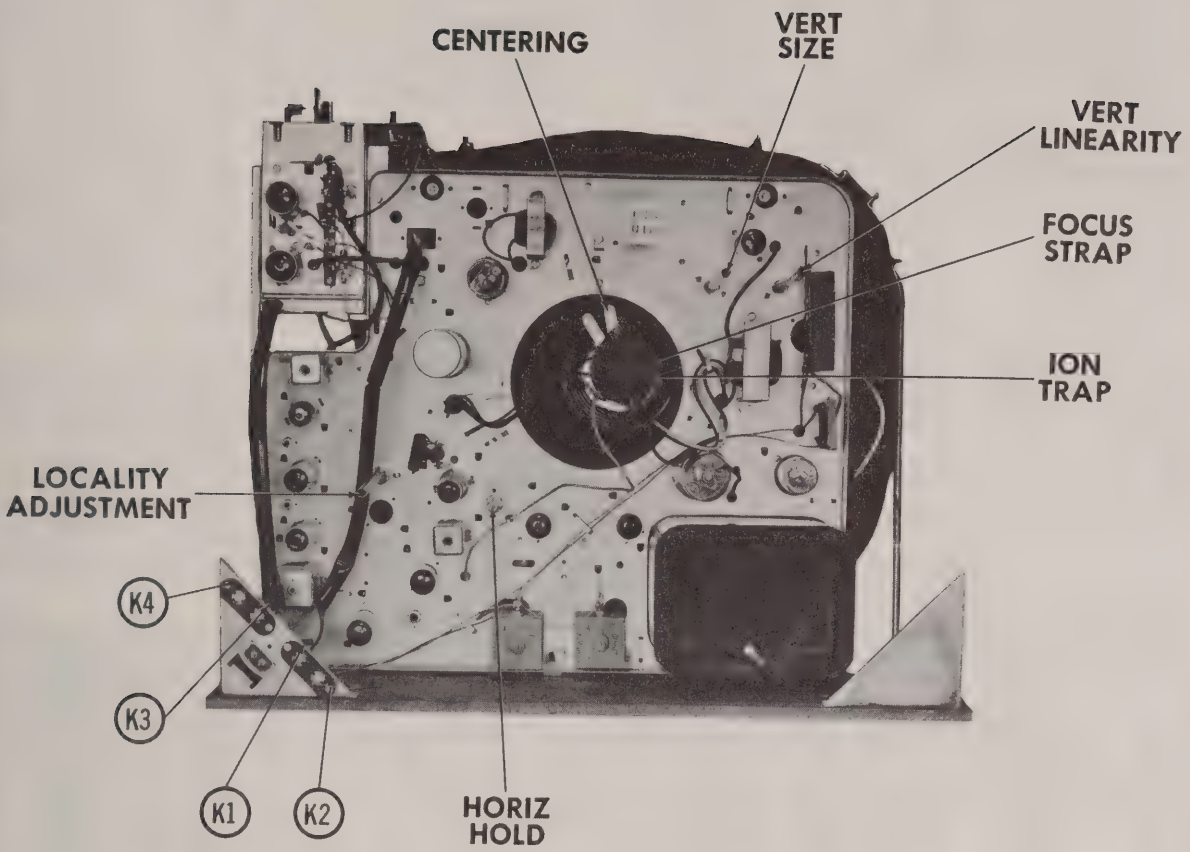
RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	2AF4A	*■ 1200Ω	22K	4.5Ω	4Ω	.1Ω	22K	*■1200Ω		
V2	4BQ7A	† 1500Ω	230K	INF	6.5Ω	5.5Ω	INF	1.5Meg	0Ω	0Ω
V3	5U8	■ 5000Ω	360K	■ 33K	5.5Ω	4.5Ω	† 4800Ω	0Ω	0Ω	10K
V4	3BZ6	1.5Meg	47Ω	6.5Ω	7.5Ω	■ 1000Ω	■ 1000Ω	0Ω		
V5	3BZ6	1.5Meg	68Ω	7.5Ω	8.5Ω	■ 1000Ω	■ 1000Ω	0Ω		
V6	6CB6	.1Ω	120Ω	8.5Ω	9.5Ω	■ 1000Ω	■ 1000Ω	0Ω		
V7	12BY7A	• 140Ω	470K	0Ω	17Ω	17Ω	16Ω	† 4100Ω	■ 18K	0Ω
V8	5U8	■ 1.5Meg	.8Ω	■ 22K	16Ω	15Ω	■ 22K	220Ω	0Ω	2.2Meg
V9	3DT6	7Ω	680Ω	4Ω	3.5Ω	† 320K	■ 10K	560K		
V10	12L6GT	NC	11Ω	† 270Ω	† 54Ω	250K	TP	14Ω	¶	
V11	6CG7	■ 5600Ω	20K	2200Ω	14Ω	15Ω	40K	350K	100K	0Ω
V12	6CM7	‡730Ω	NC	215Ω	11Ω	9.5Ω	• ‡4Meg	• 550K	• ‡4Meg	• 7000Ω
V13	6CG7	† 100K	150K	1200Ω	1.5Ω	4Ω	† 8000Ω	5Meg	1200Ω	0Ω
V14	12DQ6	TP	19Ω	TP	† 10K	470K	TP	22Ω	0Ω	TOP CAP ‡7.5Ω
V15	12AX4GTA	NC	NC	¶	NC	† 54Ω	TP	24Ω	22Ω	
V16	1B3GT	PINS 1 thru 8 HAVE INFINITE RESISTANCE								TOP CAP ‡260Ω
V17	21ATP4A	0Ω	78K	PIN 6 ‡10.5Ω	PIN 10 ‡10.5Ω	PIN 11 • 330K	PIN 12 1.5Ω			

TP TIE POINT.
NC NO CONNECTION.
* MEASURED IN UHF POSITION.
■ MEASURED FROM PIN 8 OF V10.
† MEASURED FROM OUTPUT OF M2.
‡ MEASURED FROM PIN 3 OF V15.
■ THIS READING WILL VARY, CONTROL SET FOR NORMAL OPERATION.
¶ THIS READING CAN VARY GREATLY, (10K MINIMUM), DUE TO THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.



TUBE PLACEMENT CHART



PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CHASSIS—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

1. Turn the set on and tune in a TV station, preferably with a test pattern.

2. Set the brightness and contrast controls for a normal picture.

3. Turn the horizontal hold clockwise until the picture loses sync. It may be necessary to switch off channel and back again for picture to lose sync.

4. Turn the horizontal hold slowly counter clockwise until the picture just falls into sync.

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	1.ST Converter	2AF4A	
V2	RF Amplifier	4BQ7A	
V3	Mixer-Oscillator	5L8	
V4	1st Video IF Amp.	3BZ6	
V5	2nd Video IF Amp.	3BZ6	
V6	3rd Video IF Amp	3CB6	
V7	Video Output	12BY7A	
V8	Sound IF Sync Sep.	5L8	
V9	Audio Det	3DT8	
V10	Audio Output	12L8GT	
V11	Sync Amp -Horiz AFC	6CG7	
V12	Vert Osc -Vert Output	6CM7	
V13	Horiz. Multi	6GH8	
V14	Horiz. Output	12DQ6	Note 1
V15	Damper	12AX4GTA	
V16	HV Rectifier	1B3GT	

Note 1 Some versions use 13DQ6A

PICTURE TUBE

ITEM No.	REPLACEMENT DATA			NOTES
	MAGNAVOX PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	
V17	21AT24-A	21AT24-A[1] 21AT24-A[2] 21AT24-A[3] 24V24		[1] Silver screen [2] Aluminized
	24VP4	24VP4	24VP4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP	VOLT	MAGNAVOX PART No.	ASBOVOX PART No.	CORNELL DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	150	150	270561-1	AFH1-34	AA985	FPL7	TMB-35	B-105	TVL-1429
C2A	40	300	270564-1	AFH64-47-80		FP936, 76		Q-163	R2361 *
B	40	300				TC432		MTD-4540	
C	200	150							
D	80	150							
C3A	5	350	270568-1	PR3-100	BC698	TC69	TDLD-16	D-088	TVA-2467
B	20	350				TCD255			
C4	20	300	270553-1	PRS500V20	BR3050	TC83	TD-20-500	E-315	TVA-1906

* Mon-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MAGNAVOX PART No.	ASBOVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	.1	3	25032-115	WPG-81 1.0	TCE-1		TCO-1	2	TCC-1	
C6			25046-10							
C7			25046-20							
C8	1.0		25032-114	WPG-81 1	TCZ-1		TCO-1		TCCB-V1	
C9	47		25075-21	N750-21 47	TCN-47	C30Q47U	TCT-47	NT-5447	BTCU-Q47	N750
C10	10		25068-140		TCL-10					N1500
C11	.62		25032[1] 1001							
C13	3.3-4		250320-2		529-4		3US-E			
C14	470		25075-8	BPD-00047	DD-471	BYA107AT	ED-470	UC-5347	5GA-T47	
C15	470		25075-8	BPD-00047	DD-471	BYA107AT	ED-470	UC-5347	5GA-T47	
C16	470		25075-8	BPD-00047	DD-471	BYA107AT	ED-470	UC-5347	5GA-T47	
C17	39		25075-32	N750-31 39	TCN-39	C10Q39U	TCT-39			N750
C18	39		25075-30	N750-31 39	TCN-39	C10Q39U	TCT-39			N750
C18	10		25032[1]-127	WPG-81 10	TCL-10	LT5Q	TCO-10	ZT-531	5TCC-Q	
C19			25046-9							
C20	470		25075-8	BPD-00047	DD-471	BYA107AT	ED-470	UC-5347	5GA-T47	
C21	470		25075-8	BPD-00047	DD-471	BYA107AT	ED-470	UC-5347	5GA-T47	
C22	1.5		25032[1]-124	WPG-81 1.0	TCZ-1				BTCCB-V1	
C23	30		25026-5							
C24	15		25026-4							
C25	15		250307-5	WPG-81 15	TCE-15	L76Q15	ED-15	UC-5415	5TCC-Q15	
C26	470		25075-8	BPD-00047	DD-471	BYA107AT	ED-470	UC-5347	5GA-T47	
C27	470		25075-8	BPD-00047	DD-471	BYA107AT	ED-470	UC-5347	5GA-T47	
C28	470		25075-8	BPD-00047	DD-471	BYA107AT	ED-470	UC-5347	5GA-T47	
C29	100		25075-74	BPD-00101	DD-101	L10T1	ED-100	UC-5310	5TCC-Q10	
C30	6.8		250322-125	WPG-81 8.2	C30V58C	TCC-6.8	ZT-5588	5TCCB-V68		N750
C31	470		25075-8	BPD-00047	DD-471	BYA107AT	ED-470	UC-5347	5GA-T47	
C32	470		25075-8	BPD-00047	DD-471	BYA107AT	ED-470	UC-5347	5GA-T47	
C33	1.0		250068-164	WPG-81 1.0	TCZ-1		TCO-1		5TCCB-V1	
C34	50		250068-148	WPG-81 10	TCE-10	L75Q1	TCO-10	ZT-541	5TCC-Q1	
C35	8		250068-143							
C36	1000			BPD-001	DD-102	BYA81A	ED-1000	UC-5368	5HK-D5	
C37	1500		25075-10	BPD-015	DD-152	BYA101D15	ED-0015	UC-5215	5HK-D5	
C38	1500		25075-10	BPD-015	DD-152	BYA101D15	ED-0015	UC-5215	5HK-D5	
C39	1500		25075-10	BPD-015	DD-152	BYA101D15	ED-0015	UC-5215	5HK-D5	
C40	68		25075-43	N750-81 68	TCH-68	C30Q68U	TCT -68		BTCU-Q68	N750
C41	470		250307-50	WPG-81 15	TCE-15	L75Q1	TCO-15	UC-5347	5GA-T47	
C42	15			WPG-81 15	TCE-15	C10Q15C	TCO-15		5TCC-Q15	MP0
C43	330		25075-38	BPD-00083	DD-331	L33T31	ED-330			
C44	15			WPG-81 15	TCE-15	C10Q15C	TCO-15		5TCC-Q15	MP0
C45	470		25075-8	BPD-00047	DD-471	BYA107AT	ED-470	UC-5347	5GA-T47	
C46	680		250307-51		DE-681	L75T68	ED-680	UC-5368	5GA-T68	
C47	1000		25075-14	BPD-001	DD-102	BYA81A	ED-1000	DC531	5HK-D1	
C48	.1	200	25032-113		TCZ-1		TCO-1		5TCC-Q1	
C49	33		250068-148							
C50	5000		25075-1	BPD-005	DD-502	BYA105	ED-005	DC525	5HK-D6	
C51	470		250307-50		DE-471	L75T47	ED-470	UC-5347	5GA-T47	
C52	1	400	25031-13							
C53	220		25075-37							
C54	680		25075-26	BPD-00068	DD-681	L10T68	ED-680	UC-5368	5GA-T68	
C55	680		25075-76	BPD-00068	DD-681	L10T68	ED-680	UC-5368	5GA-T68	
C56	10		250068-165	WPG-81 10	TCE-10	C10Q1C	TCO-10	ZT-541	5TCC-Q	MP0
C57	35	300	25075-20	PRMN-35		C10R2F35		ZTM-2525	ZTM-F25	
C58	1000		25075-14	BPD-001	DD-102	BYA81A	ED-1000	DC531	5HK-D1	
C59	1000		25075-14	BPD-001	DD-102	BYA81A	ED-1000	DC531	5HK-D1	
C60	5000		25075-1	BPD-005	DD-502	BYA105	ED-005	DC525	5HK-D6	
C61	5000		250093-147							ND78
C62	5000		25075-1	BPD-005	DD-502	BYA105	ED-005	DC525	5HK-D6	
C63	10000		25075-3	BPD-01	DD-103	BYA81	ED-01	DC531	5HK-D1	
C64	1000		250307-53	BPD-001	DD-103	BYA81A	ED-1000	DC531	5HK-D1	
C65	15		250068-148	HI 15	DE-151	L75Q15	ED-15	UC-5415	5GA-Q15	
C66	.047	200	250302-11		DF-503	CUB2347			GEM-2347	
C67	5000		25075-1	BPD-005	DD-502	BYA105	ED-005	DC525	5HK-D6	
C68	10000		25075-3	BPD-01	DD-103	BYA81	ED-01	DC531	5HK-D1	
C69	.0033	400	250241-4	BPD-0033	DF-333	CUB4033	ED-0033	GEM-4233	KTM-2332	
C70	.022	400	250241-9	BPD-02	DF-203	CUB4232	ED-02	GEM-4232	KTM-S22	
C71	.01	400	250241-8	BPD-01	DF-103	CUB4132	ED-01	GEM-4132	KTM-S1	
C72	.047	400	250241-11	BPD-05	DF-503	CUB4847		GEM-4147	KTM-S47	
C73	.022	400	250241-9	BPD-02	DF-203	CUB4232	ED-02	GEM-4232	KTM-S22	
C74	.022	400	250241-9	BPD-02	DF-203	CUB4232	ED-02	GEM-4232	KTM-S22	

CAPACITORS (cont)

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP	VOLT	MAGNAVOX PART No.	ASBOVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C75	.047	400	250241-11	BPD-05	DF-503	CUB4647		GEM-4147	KTM-S47	
C76	470		250307-50	BPD-00047	DD-471	BYA107AT	ED-470	UC-5347	5GA-T47	
C77	1000		250178-14	BPD-001	DD-102	BYA81D	ED-1000	DC531	5HK-D1	
C78	.0022	400	250241-5	BPD-0023	DF-223	CUB4032	ED-0023	GEM-4223	KTM-D23	
C79	1000		250178-14	BPD-001	DD-102	BYA81D	ED-1000	DC531	5HK-D1	
C80	.01	400	250241-7	BPD-01	DD-103	CUB4B2	ED-01	GEM-411	KTM-S1	
C81	390		250185-1089	1484-00039		1RS739			M6-339	
C82	1900		250160-1072	1484-00039		1RS089			M6-339	
C83	470		250185-1090	1484-00047		1RS747			M6-347	
C84	5000		250178-1	BPD-005	DD-502	BYA105	ED-005	DC525	5HK-D5	
C85	047	400	250241-11	BPD-05	DF-503	CUB4647		GEM-4147	KTM-S47	
C86	.042	200	250213-17			CUB2323		GEM-2323	ZTM-S22	
C87	150	3000	250178-43	RVD-30-150	DD30-151	HVB30T151			30GAB-T15	
C88	68	2000	250178-32	BPD-30-68	DD30-680	HVA30D68		DC30468		
C89	047	400		BPD-05	DF-503	CUB4847		GEM-4147	KTM-S47	
C90	1000		250178-14	BPD-001	DD-102	BYA81A	ED-1000	DC531	5HK-D1	
C91	10000	1000	250219-2							
C92	1000		250178-14	BPD-001	DD-102	BYA81D	ED-1000	DC531	5HK-D1	
C93	1000		250178-14	BPD-001	DD-102	BYA81D	ED-1000	DC531	5HK-D1	
C94	1000		250178-14	BPD-001	DD-102	BYA81D	ED-1000	DC531	5HK-D1	
C95 A	350		250219-8	BPD-001	DD-102	BYA81D	ED-1000	DC531	5HK-D1	
B	500					BYCED108	ED-0015	DC5515	5HK-D15	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	RESISTANCE	WATTS	MAGNAVOX PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES	
R1A	100K	1	220183-11					Volume - Tap @ 100K	
B	Switch								
R2	1500Ω		220133-9					Contrast - Tap @ 300Ω	
R3	2.5Meg		220245-2				PTA25L	Brightness - Note 1	
R4	2.5Meg		D220148-2				PTA25L	Vert. Hold - Note 2	
R5	5Meg		220553-3					Vert. Size	
R6	750Ω		220554-2				PTA75L	Vert. Lin.	

Note 1. Alternate part #220656-1, 5Meg may be used in some versions.
Note 2. Alternate part #220653-1, 1Meg, with 300K stop may be used in some versions.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MAGNAVOX PART No.	IRC PART No.	
R7	100K		220104-85	BTS-100K	
R8	33K		220104-77	BTS-33K	
R9	820Ω	1	220145-01	BTA-820	
R10	100K		220104-86	BTS-100K	
R11	470K		220104-94	BTS-470K	
R12	470K		220104-81	BTS-470K	
R13	680Ω		220104-92	BTS-680	
R14	8200Ω		220104-73	BTS-8200	
R15	33K		220104-77	BTS-33K	
R16	330K		220104-93	BTS-330K	
R17	180K		220104-89	BTS-180K	
R18	47K		220104-79	BTS-47K	
R19	10K		220104-74	BTS-10K	
R20	10K		220104-74	BTS-10K	
R22	150Ω		220104-52	BTS-150	
R23	3300Ω		220104-75	BTS-3300	
R24	4700Ω 5%	1	220095-175	BTA-4700 5%	
R24	330Ω		220104-58	BTS-330	
R25	3500Ω	1	220105-54	BTA-3500	
R26	1000Ω		220104-15	BTS-1000	
R27	6800Ω		220104-72		
R28	1000Ω		220104-13	BTS-1000	
R29	470Ω		220104-47	BTS-470	
R30	1000Ω		220104-13	BTS-1000	
R31	18K		220104-77	BTS-18K	
R33	1000Ω		220104-13	BTS-1000	
R33	68Ω		220104-48	BTS-68	
R34	18K		220104-77	BTS-18K	
R35	1000Ω		220104-13	BTS-1000	
R36	120Ω		220104-50	BTS-120	
R37	1.5Meg		220094-33	BTS-1.5Meg	
R38	4700Ω 5%		220094-175	BTS-4700 5%	
R39	470Ω		220104-94	BTS-470K	
R40	150K 5%		220104-88	BTS-150K 5%	
R41	4000Ω	5	240077-1	WW-4000	
R42	120Ω		220104-5	BTS-120	
R43	18K	2	220104-77	BTS-18K	
R44	10K	1	220104-74	BTA-10K	
R45	100K		220104-86	BTS-100K	
R46	2.2Meg		220094-35	BTS-2.2Meg	
R47	2.2Meg		220094-35	BTS-2.2Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MAGNAVOX PART No.	IRC PART No.	
R48	33K	1	220105-78	BTA-33K	
R49	3300Ω		220104-54	BTS-330	
R50	560K		220104-95	BTS-560K	
R51	220K		220104-90	BTS-220K	
R52	10K	1	220105-74	BTA-10K	
R53	680Ω		220104-60	BTS 680	
R54	56K		220104-85	BTS-56K	
R55	560K		220104-95	BTS-560K	
R56	470K		220104-94	BTS-470K	
R57	33K		220104-80	BTS-33K	
R58	1.5Meg		220094-33	BTS-1.5Meg	
R59	470K		220104-94	BTS-470K	
R60	22K		220104-76	BTS-22K	
R61	2200Ω		220104-71	BTS-2200	
R62	5600Ω		220104-71	BTS-5600	
R63	2.2Meg		220094-35	BTS-2.2Meg	Note 1
R64	270K		220104-91	BTS-270K	Note 1
R65	10K		220104-74	BTS-10K	
R66	68K		220104-84	BTS-68K	
R67	68000Ω	2	220105-72	BTA-6800	
R68	680Ω		220104-60		
R69	680Ω		220104-60		
R70	100K		220104-86		
R71	150K		220104-88		
R72	100K		220104-86		
R73	4.7Meg		220094-35	BTS-4.7Meg	
R74	3.3Meg		220094-34	BTS-3.3Meg	
R75	6800Ω		220104-71		
R76	1200Ω		220104-53	BTS-1200	
R77	150K		220104-88	BTS-150K	
R78	5600Ω		220104-71		
R79	100K		220104-86		
R80	470K		220104-94		
R81	4700		220104-58	BTS-470	
R82	10K	2	220105-74	BTA-10K	
R83	4.7Ω		220109-3	BW-4.7	
R84	3.3Meg		220094-34	BTS-3.3Meg	
R85	2200Ω		220104-66	BTS-2200	
R86	34Ω	20	240071-20		
R87	470Ω		220104-29	BTS-470K	
R89	47K		220104-82		

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA							NOTES
		MAGNAVOX PART No.	Hallderson PART No.	Merit PART No.	RCA TYPE No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	Vert. Osc.	220301-4							
T2	Horiz. Output	220311-1							
T3	Vert. Output	220310-1	Z1604	A-3037	222TI	V313	A-3123	26952	A-102X
T4A	Yoke-Horiz (13M2R) (90°) Vert.(64M2R)	241223-1	DF60T①	MFD-89①	2358M ①	Y90F19/43 ①	DY-16A①	Y-18 ①	Y-41 & MW9
M10	Rear Cover and Centering Device	241223-1							YC1

① Use original rear cover and centering device and original yoke damping network if necessary.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						
	PRI.	SEC.	MAGNAVOX PART No.	Hallderson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T5	2500Ω	3-4Ω	220302-2	22111	A-2928	A-3078	22845	S-1X	

COILS (RF-IF)

ITEM No.	USE	MAGNAVOX PART No.	NOTES	ITEM No.	USE	MAGNAVOX PART No.	NOTES
L1	RF Choke	260074-30		L11	Ant. Trans.	260041-2	
L3	RF Choke	260074-30		L12	RF Choke	260062-8	4.7 Microhenries, IRC part #CLA
L4	Cathode Choke	260052-7					
L5	Fil. Choke	260076-8		L13	UHF IF Input Coil	260040-1	
L6	Fil. Choke	260076-8		L14	Neut. Coil	260015-66	
L7	RF Choke	260076-8		L15	RF Choke	260062-8	.47 Microhenries, IRC part #CLA
L8	RF Choke	260076-50		L18	RF Choke	260062-9	1 Microhenry
L9	IF Trap	260015-36		L17	Mixer Plate Coil	260040-1	
L10	IF Trap	260015-38					

ITEM No.	USE	REPLACEMENT DATA				NOTES
		MAGNAVOX PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L20	1st. Video IF	261230-1				Includes 47.25MC trap
L19	2nd. Video IF	261203-1				Includes 41.25MC trap
L20	3rd. Video IF	261232-1			6321	Includes 41.25MC trap
L21	Tweet Trap	261201-1	18-1005		6613	11 Microhenries
L22	Shunt Peaking Coil	261234-2	19-3500		6574	800 Microhenries
L23A	4.5MC Trap	261218-1				
B	1st. Sound IF					
L24	Series Peaking Coil	261234-3	19-3250 *	TV-185 *	6581 *	280 Microhenries, wound on 6800u resistor
L25	Shunt Peaking Coil	261234-4	19-3260	TV-184	6582	286 Microhenries
L26	Shunt Peaking Coil	261234-1			6548 +	135 Microhenries, wound on 6900 resistor
L27	Series Peaking Coil	261234-5	18-3128 +		6583 +	120 Microhenries, wound on 33000 resistor
L28	2nd. Sound IF	261219-1				
L29	Quadrature Coil	261207-1				
L30	IF Choke	261211-1	19-1004		6610	6.4 Microhenries

* Parallel with 6800Ω resistor.
+ Parallel with 680Ω resistor.
* Parallel with 3300Ω resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MAGNAVOX PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Rem PART No	Thordarson PART No.
L31	65Ω		261209-1	19-1576 *	TV-163 *	6200 *			HS-5*

* Drill new mounting hole.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE @ CURRENT 1000 Cps	MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L33	.330A	84Ω	1 HY	220302-2	C9037 ①	C-2998 ①	C-2327	26C44 ①	C-24X

① Drill one new mounting hole.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	MAGNAVOX PART No.	REPLACEMENT DATA	
K1	Ant. Input	470MMF, 1Meg	250751-1	Centralab	DA532
K2	Ant. Input	470MMF, 1Meg	250751-1	Centralab	DA532
K3	Ant. Input	470MMF, 1Meg	250751-1	Centralab	DA532
K4	Ant. Input	470MMF, 1Meg	250751-1	Centralab	DA532
K5	Vert. Integrator	2000MMF, 5000MMF, 8000MMF, 22K, 820Ω, 820Ω	250755-1	Aerovox Centralab Erie Sprague	PA501 PC-104 1405-0 105E1
K6	Sync Coupler	25MMF, 150MMF, 10000MMF, 2.2Meg, 470K			

RECTIFIERS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CURRENT (Measured)		MAGNAVOX PART No.	FEDERAL PART No.	GENERAL ELECTRIC PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	
M1	220A		250251-8 ①	1090A 1	1N1007 2	HS3098L 1	6S300 1	300 1	
M2	220A		250251-8 ①	1090A 1	1N1007 2	HS3098L 1	6S300 1	300 1	

① Selenium type. ② Germanium type.

CRYSTAL DIODES

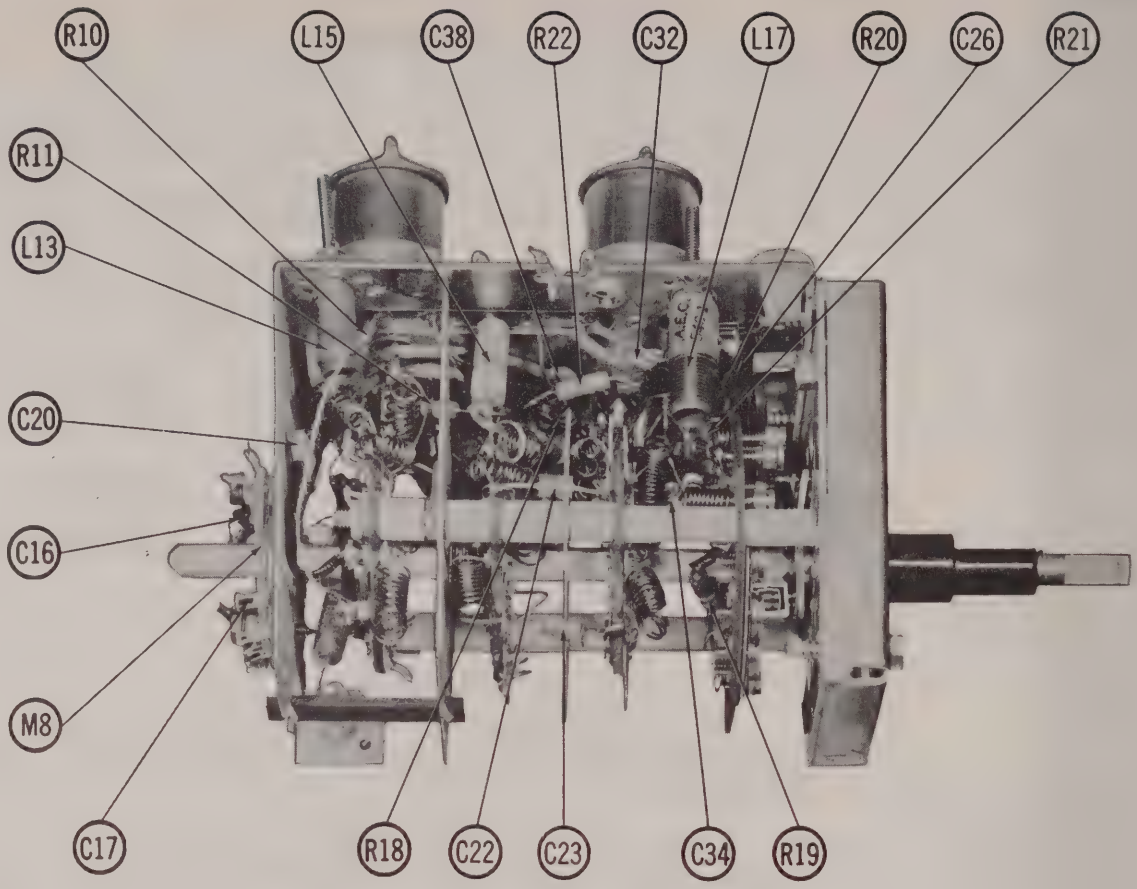
ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		MAGNAVOX PART No.	CBS PART No.	SYLVANIA PART No.	
M3	4JB2C8	230098-1	IN82A	IN82A	UHF Mixer (Clip-in)
M4	1N295 *		1N60	1N60	Video Det. (Pigtail)

* A 1N54 may be used in some versions.

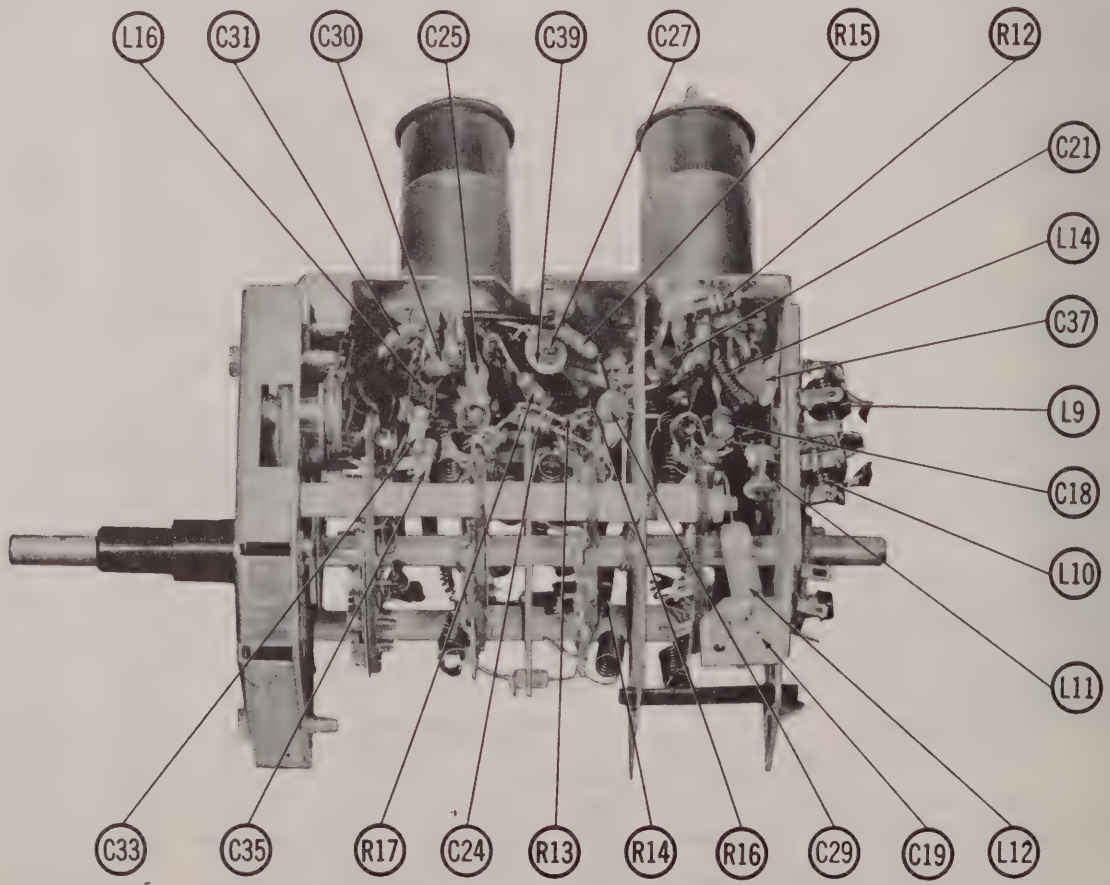
MISCELLANEOUS

ITEM No.	PART NAME	MAGNAVOX PART No.	NOTES
M5	Tuner	700556-2	UHF
M6	Tuner	700558-2	VHF
M7	Video Det. Assy.	261204-1	Includes 4th. Video IF, Capa., Series peaking coil, M4
M8	Switch	260247-1	UHF-VHF (Rotary wafer type)
M9	Switch	260261-3	Locality Adjustment (Rotary wafer type)
M10	Centering Device	241223-1	
M11	Ion Trap	260492-9	Includes rear yoke cover

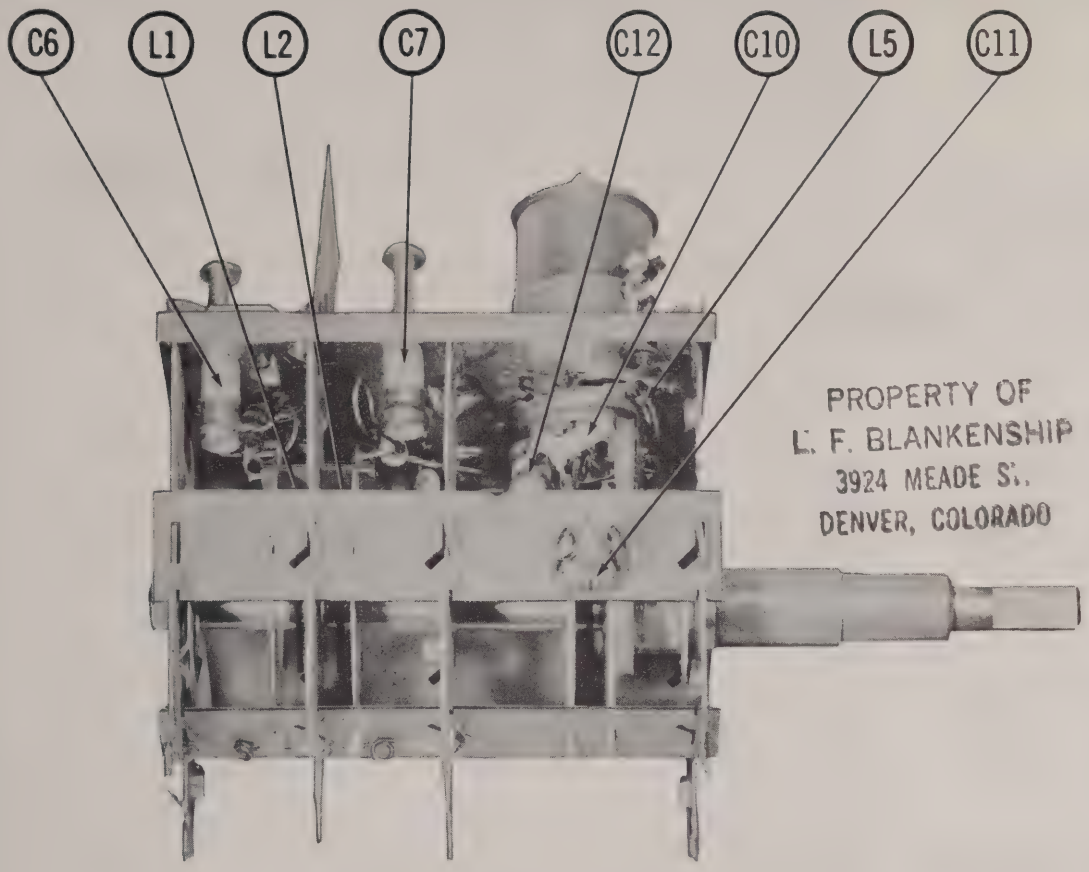
MAGNAVOX CHASSIS U73-01AA, U73-02AA, V73-01AA, V73-02AA (73 Series)



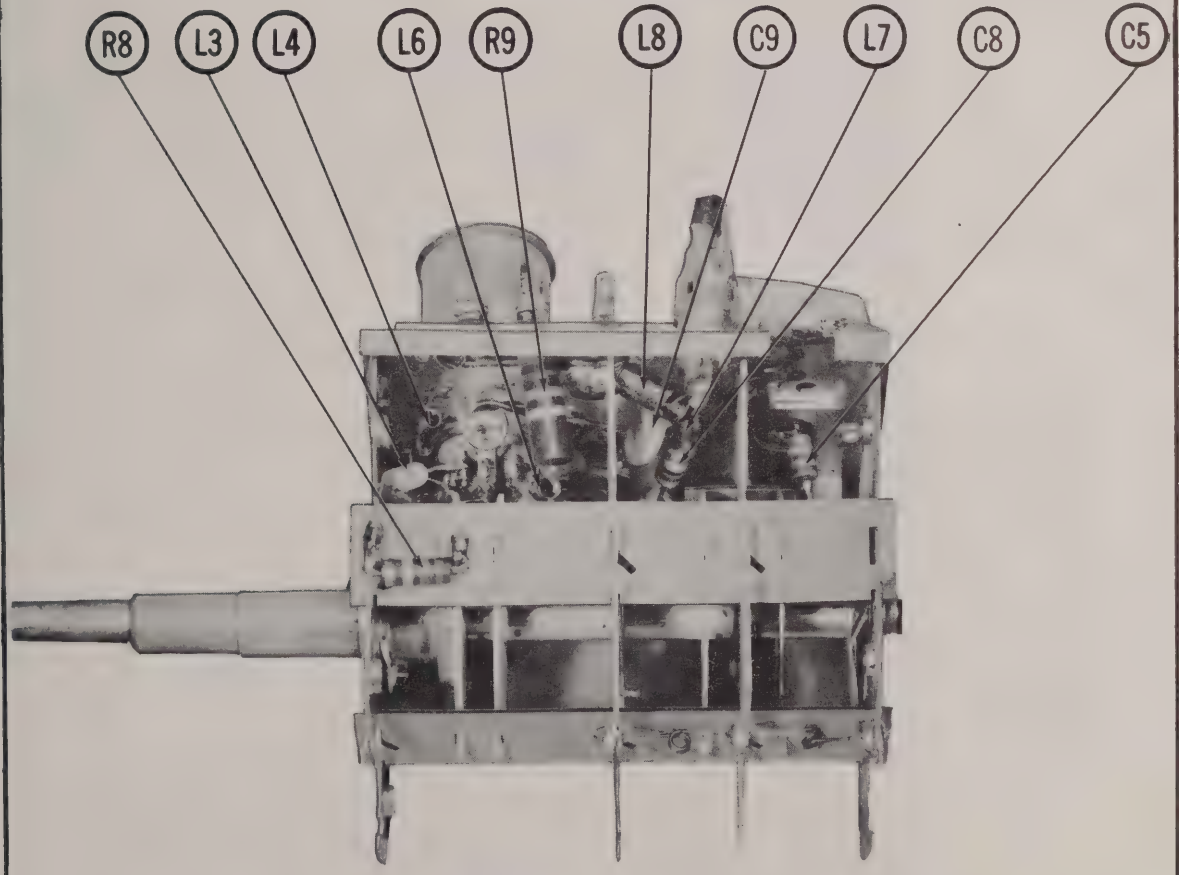
VHF TUNER LEFT SIDE



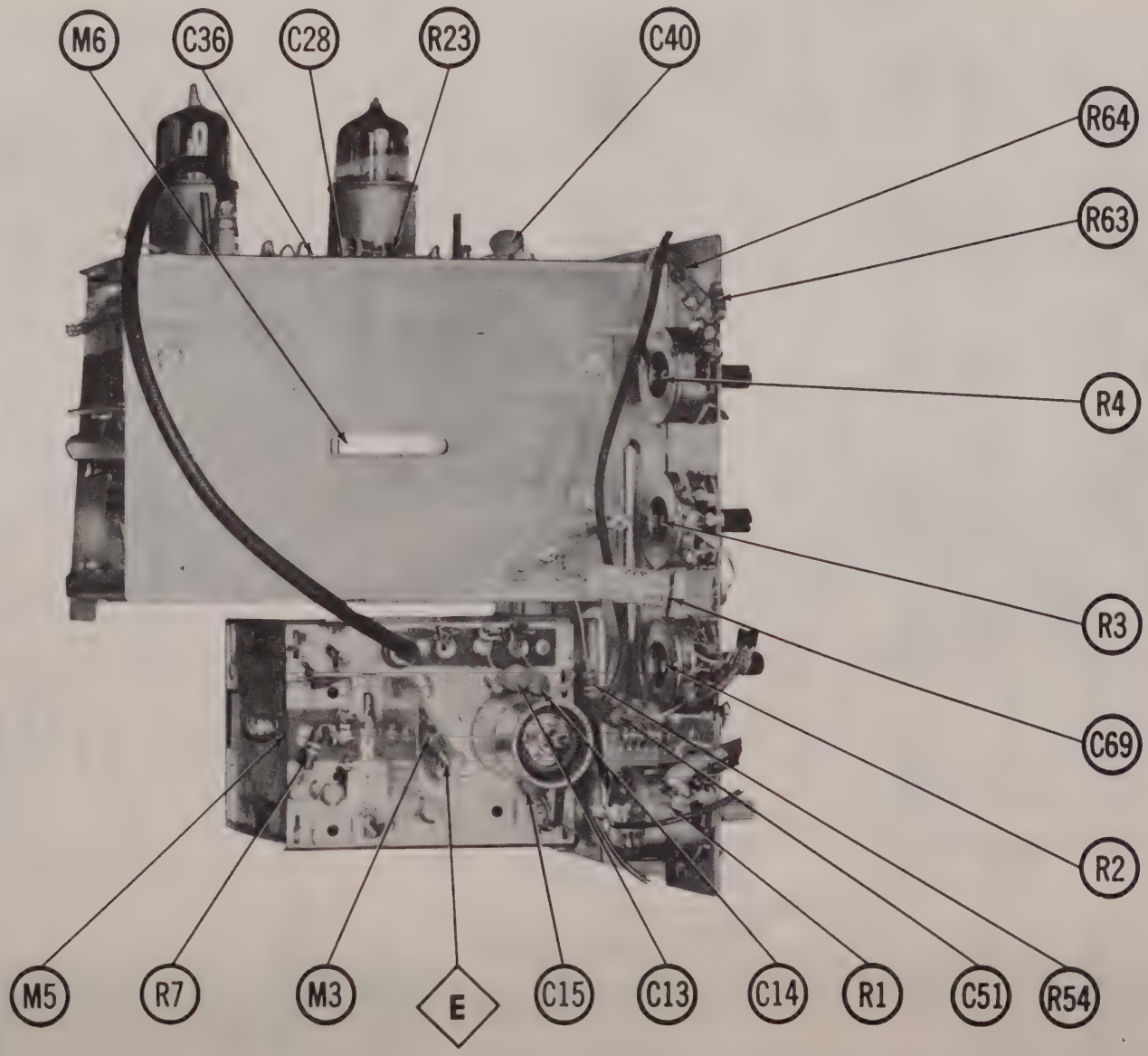
VHF TUNER RIGHT SIDE



UHF TUNER LEFT SIDE



UHF TUNER RIGHT SIDE

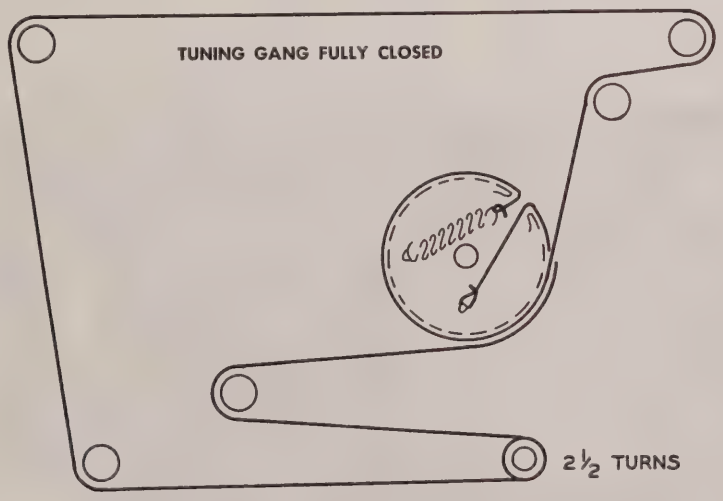


TUNER & CONTROL PANEL ASSEMBLY

PROPERTY OF
[illegible]RENSHIP
3924 MEADE ST.
DENVER, COLORADO

MONITORADIO
MODEL MR-33

TRADE NAME	Monitoradio Model MR-33
MANUFACTURER	Monitoradio Div., I.D.E.A., Inc., 7900 Pendleton Pike, Indianapolis 26, Indiana
TYPE SET	AC Operated FM Receiver
TUBES (Eight)	Types 6BJ6 RF Amplifier, 6U8 Mixer-Osc., 6BJ6 1st IF Amplifier, 6BJ6 2nd IF Amplifier, 6AL5 Ratio Detector, 12AX7 Squelch-AF Amp., 6AK6 Output, 6X4 Rectifier
POWER SUPPLY	105-125 Volts AC-60 Cycles — RATING .35 Amp. @ 117 Volts AC (36 Watts)
TUNING RANGE — FREQ. MOD.	30MC-50MC



DIAL CORD STRINGING

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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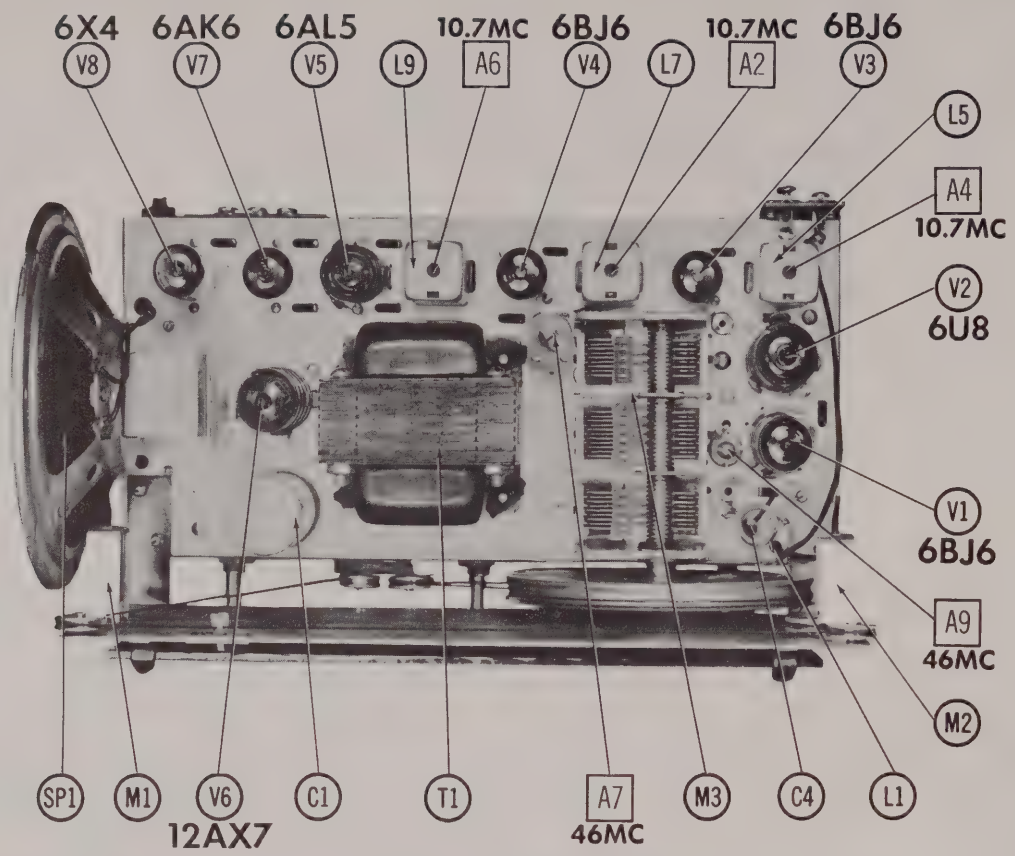
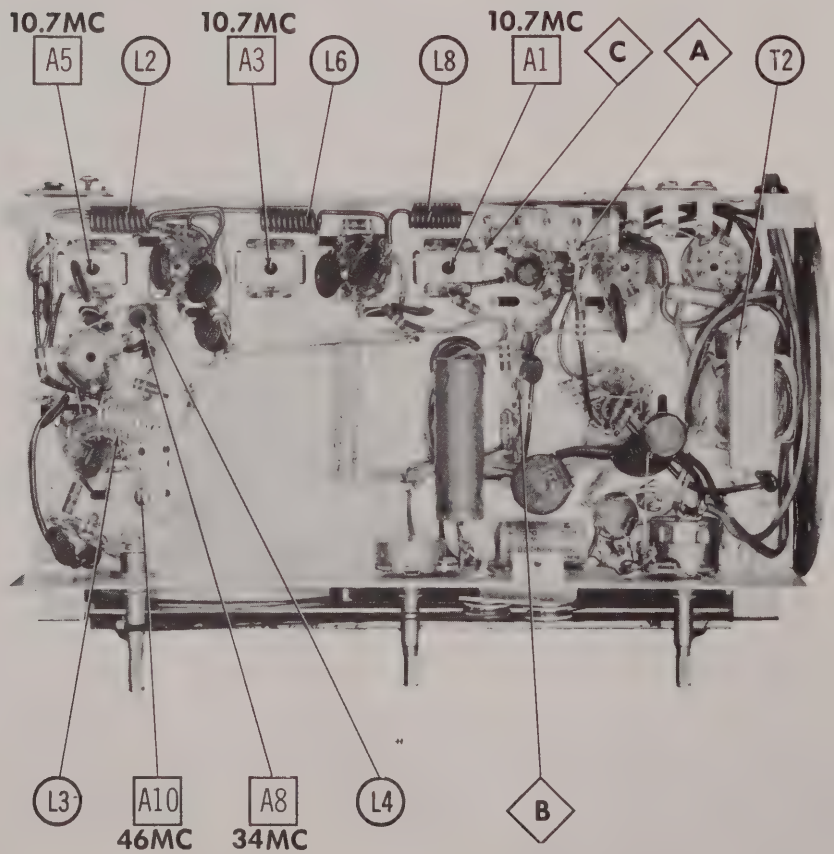


CHASSIS-TOP VIEW



CHASSIS BOTTOM VIEW INDUCTOR AND ALIGNMENT IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	6BJ6	
V2	Mixer-Oscillator	6U8	
V3	1st. IF Amplifier	6BJ6	
V4	2nd. IF Amplifier	6BJ6	
V5	Ratio Detector	6AL5	
V6	Squelch-AF Amp.	12AX7	
V7	Output	6AK6	
V8	Rectifier	6X4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	Monitoradio PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	250	300-082-8	AFH3-20	XCO732	FP321	TMT-20	T-090	TVL-3540
B	20	250							
C	20	25							
C2	2	50	300-109-1	PRS50V2	BBR2-50	TC302	TD-2-50	MT-0502	TVA-1301
C3	2	50	300-109-1	PRS50V2	BBR2-50	TC302	TD-2-50	MT-0502	TVA-1301

FIXED CAPACITORS

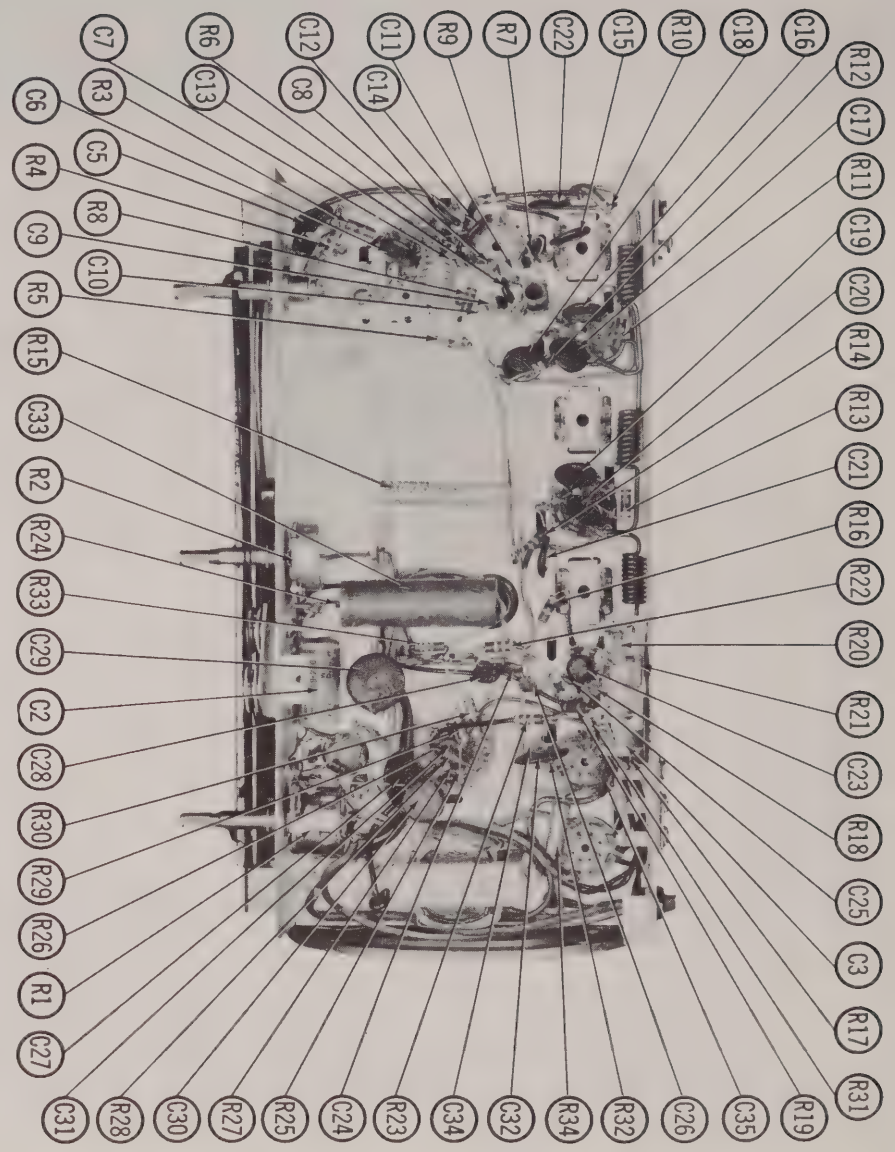
Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Monitoradio PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	56			SI 56	DD-560	L10Q56	ED-56	UC-5456	5GA-Q56	
C5	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C6	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C7	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C8	56			SI 56	DD-560	L10Q56	ED-56	UC-5456	5GA-Q56	
C9	82	500		1469-000082	TCZ-82	22R5Q82	TCO-82		MS-482	5%
C10	68			N750-SI 68	TCN-68	LT6Q68	TC7-68		5TCC-Q68	N750
C11	27				TCN-27	CTA6Q27U	TC7-27			N750
C12	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C13	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C14	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C15	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C16	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C17	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C18	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C19	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C20	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C21	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C22	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C23	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C24	330			BPD-00033	DD-331	L10T33	ED-330	UC-5333	5GA-T33	
C25	330			BPD-00033	DD-331	L10T33	ED-330	UC-5333	5GA-T33	
C26	330			BPD-00033	DD-331	L10T33	ED-330	UC-5333	5GA-T33	
C27	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C28	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C29	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C30	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C31	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C32	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C33	.25	400		P488N-25		CUB4P25		GEM-4025	4TM-P25	
C34	270			BPD-00027	DD-271	L10T27	ED-270	UC-5327	5GA-T27	
C35	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C36	1.5-10				829-10					
C37	1-7.5				829-7		532-B			
C38	5-20									

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESIST-ANCE	WATTS	Monitoradio PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1Meg	1/2	100-093-8	B-70	A47-1Meg-Z	Q13-137	U53	Volume
B	Shaft			Not req.	KSS-3	Not req.	Not req.	
C	Switch			KB-1	SWE-12	76-1	US-26	
R2A	25K	1/2	100-093-9	B-27	A47-25K-V		U28	Squelch
B	Shaft			Not req.	KSS-3		Not req.	

CHASSIS—TOP VIEW



ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Turn volume and squelch controls fully clockwise.
Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting. To set pointer, turn tuning capacitor fully closed and set pointer to the extreme end of the low frequency end of dial.

IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	.001MFD	High side to pin 2 (grid) of 6U8 (V2). Low side to chassis.	10.7MC	Point of non-interference	DC probe to point Ⓐ. Common to chassis.	A1, A2, A3, A4, A5	Adjust for maximum deflection.
2.	"	"	"	"	DC probe to point Ⓑ. Common to point Ⓒ.	A6	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
3.	.001MFD	High side to pin 2 (grid) of 6U8 (V2). Low side to chassis.	10.7MC (±200KC Swp)	Point of non-interference	Vert. Amp. to point Ⓐ Low side to chassis.	A1, A2, A3, A4, A5	Disconnect stabilizing capacitor C3. Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
4.	"	"	"	"	Vert. Amp. to point Ⓑ. Low side to chassis.	A6	Reconnect capacitor C3. Adjust A6 for maximum straightness of diagonal line with 10.7MC marker appearing midway between peaks, similar to Fig. 2.

RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	22Ω Carbon Resistor	High side to antenna terminal #1. Low side to terminal #2.	46	46	DC probe to point Ⓐ. Common to chassis.	A7	Adjust for maximum deflection.
6.	"	"	34	34	"	A8	Adjust for maximum deflection. Repeat steps 5 and 6.
7.	"	"	46	46	"	A9, A10	Adjust for maximum deflection.
8.	"	"	34	34	"	L1, L3	Compress or expand coils for maximum deflection. Repeat steps 7 and 8.

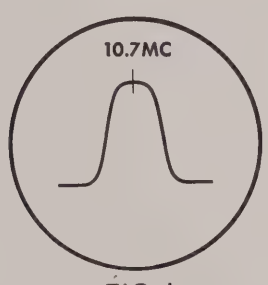


FIG. 1

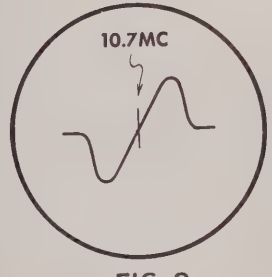


FIG. 2

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BJ6	1.5meg	0Ω	0Ω	.1Ω	*3.9K	*3.9K	0Ω		
V2	6U8	*3.4K	100K	*100K	.1Ω	0Ω	*3.4K	0Ω	0Ω	10K
V3	6BJ6	.6Ω	82Ω	0Ω	.1Ω	*3.4K	*3.4K	0Ω		
V4	6BJ6	.6Ω	82Ω	0Ω	.1Ω	*3.4K	*3.4K	0Ω		
V5	6AL5	INF.	INF.	0Ω	3Ω	■7.8K ▲26K	0Ω	■ 8.2K ▲ 26K		
V6	12AX7	*330K	■54K ▲70K	560Ω	.1Ω	.1Ω	*220K	2.4meg	10K	0Ω
V7	6AK6	470K	560Ω	0Ω	.1Ω	* 315Ω	*270Ω	560Ω		
V8	6X4	110Ω	INF.	0Ω	.1Ω	INF.	100Ω	9K		

* MEASURED FROM PIN 7 OF V8.
■ SQUELCH CONTROL IN FULLY CLOCKWISE POSITION.
▲ SQUELCH CONTROL IN FULLY COUNTER-CLOCKWISE POSITION.

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Monitoradio PART No.	IRC PART No.	
R3	1Meg			BTS-1Meg	
R4	470K			BTS-470K	
R5	1000Ω			BTS-1000	
R6	100K			BTS-100K	
R7	10K			BTS-10K	
R8	470Ω			BTS-470	
R9	100K			BTS-100K	
R10	470Ω			BTS-470	
R11	82Ω			BTS-82	
R12	470Ω			BTS-470	
R13	82Ω			BTS-82	
R14	470Ω			BTS-470	
R15	2700Ω	4			
R16	68Ω			BTS-68	
R17	8.2Ω 5%	1			
R18	1000Ω			BTS-1000	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Monitoradio PART No.	IRC PART No.	
R19	1500Ω			BTS-1500	
R20	6800Ω			BTS-6800	
R21	6800Ω			BTS-6800	
R22	47K			BTS-47K	
R23	47K			BTS-47K	
R24	47K			BTS-47K	
R25	10K			BTS-10K	
R26	560Ω			BTS-560	
R27	220K			BTS-220K	
R28	2.2Meg			BTS-2.2Meg	
R29	47K			BTS-47K	
R30	220K			BTS-220K	
R31	470K			BTS-470K	
R32	560Ω			BTS-560	
R33	33K			BTS-33K	
R34	270Ω	1		BTA-270	

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	Monitoradio PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VCT @ .35A	375VCT @ .052A	6.3VAC @ 2.5A		500-160-3				22R28 ①	

① Use Universal Mtg. Brackets

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Monitoradio PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	8500Ω	3-4Ω	300-240-1	Z1116	A-2927 ①	A-8114	24S52	S-7X	① Drill new mounting hole.

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

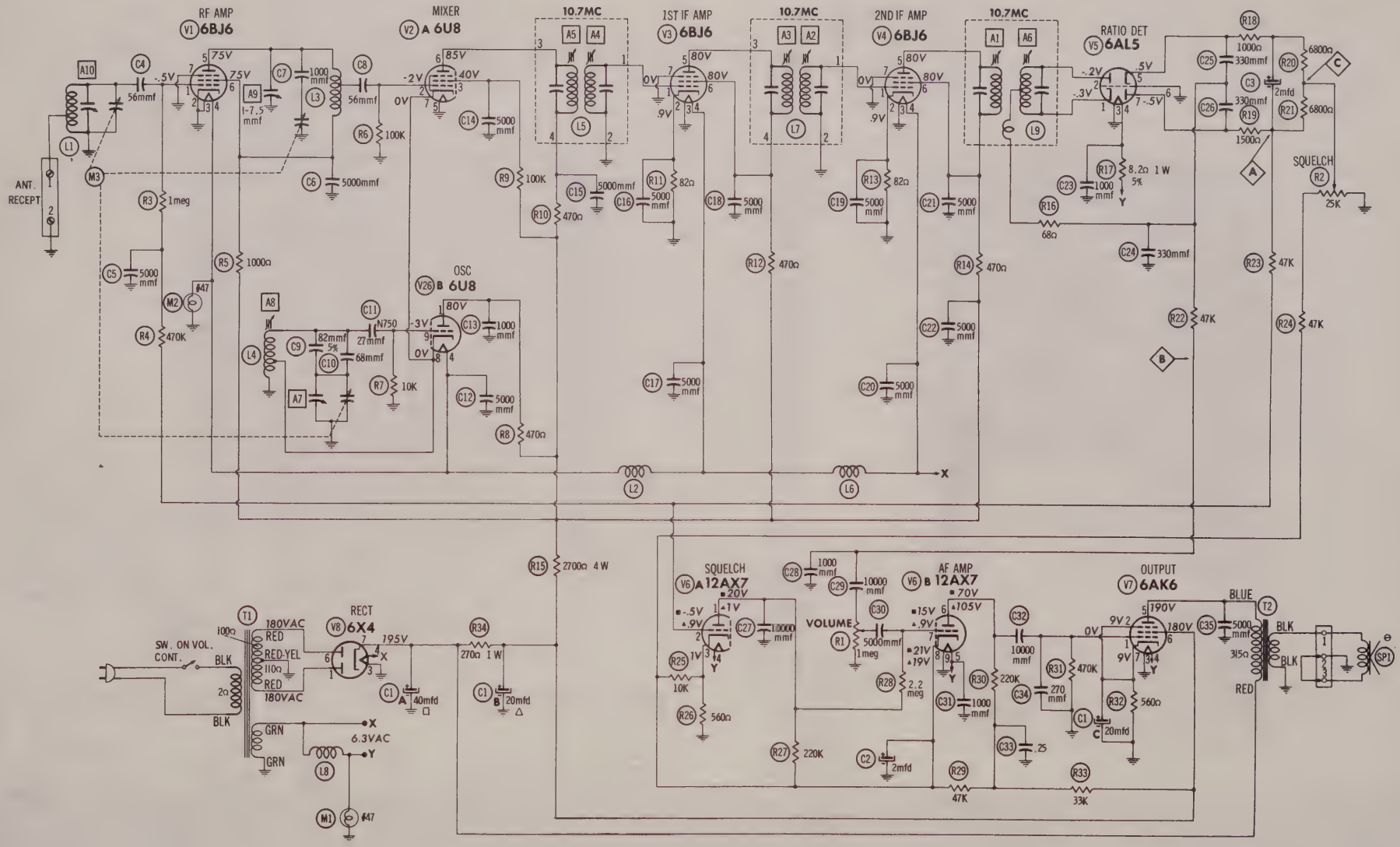
ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Monitoradio PART No.	QUAM PART No.	
SP1	5"	PM	3-4Ω	750B21 ①	5A1	① Alternate Part #300-071-3

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		Monitoradio PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Antenna Coil	300-276-2				
L2	Fil. Choke	100-710-3	19-1000	BC-561	4602	1.1 Microhenry
L3	RF Coil	300-276-1				
L4	Osc. Coil	300-530				
L5	Input IF	300-077-2	16-3487	FM-254	1463	
L6	Fil. Choke	100-710-2	19-1000	BC-561	4602	1.1 Microhenry
L7	Output IF	300-077-2	16-3487	FM-254	1463	
L8	Fil. Choke	100-710-1	19-1000	BC-561	4602	1.1 Microhenry
L9	Ratio Det.	500-314	17-3498	FM-255	6205	

MISCELLANEOUS

ITEM No.	PART NAME	Monitoradio PART No.	NOTES
M1	Dial Light		#47
M2	Dial Light		#47
M3	Tuning Gang	500-150-4	3 Gang
	Knob	300-531-1	Tuning
	Knob	300-531-2	ON-OFF-Volume
	Knob	300-531-3	Squelch
	Dial Scale	500-168-1	Glass
	Pointer	300-285-1	



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369-14

PHOTOFACT* Folder
*TRADE MARK

MOTOROLA MODELS Y14P10-1, -2, Y14P11-1, -2, 14P10-1, -2, 14P11-1, -2 (Ch. TS-425, Y)

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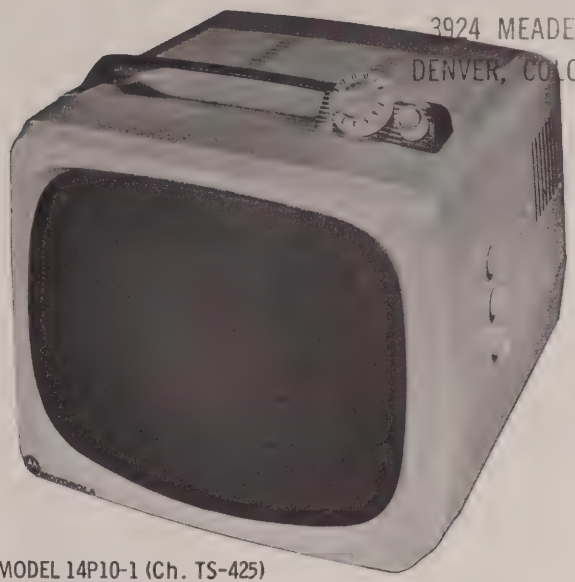
DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 4 push-on type control knobs from the top and 3 from the side.
2. Remove 3 metal screws and the rear cover.
3. Remove 2 speaker leads, picture tube socket, yoke plug and cabinet ground clip.
4. Remove 1 metal screw in the center of the chassis, directly above the yoke.
5. Remove 2 speaker nuts and the speaker.
6. Remove 2 chassis bolts from the bottom.
7. Partially remove the chassis. Remove the HV lead ; then remove the chassis.



MODEL 14P10-1 (Ch. TS-425)

CAUTION NOTE

ONE SIDE OF AC LINE CONNECTED TO CHASSIS
Care should be exercised when connecting test equipment or physically contacting the chassis.

MODELS	CHASSIS
Y14P10-1, Y14P10-2, Y14P11-1, Y14P11-2	TS-425Y
14P10-1, 14P10-2, 14P11-1, 14P11-2	TS-425

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF oscillator is possible by removing the channel selector and fine tuning knobs. Set the fine tuning at the center of its range. The adjustments (located in a circle around the shaft) should be made in sequence from the highest to the lowest channel in the area. Channel 13 adjustment is located at 12 o'clock, proceed in a counter clockwise direction adjusting for best picture and sound.

PICTURE TUBE SAFETY GLASS CLEANING

Remove 2 metal screws from the bottom of the front. Swing front out at the bottom and up to remove.

FOCUS

The focus may be varied by the position of a strap on the base of the picture tube. The strap can be connected between pins 6 and 10 or 6 and 1. Readjust the ion trap for the best focus consistent with maximum brightness.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to set. Set the horizontal hold at the center of its range and adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally. (For location see tube placement chart).

FUSES

A 5Ω fusible resistor (R93) is used for LV power supply protection. (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

MOTOROLA MODELS Y14P10-1, -2, Y14P11-1, -2, 14P10-1, -2, 14P11-1, -2 (Ch. TS-425, Y)

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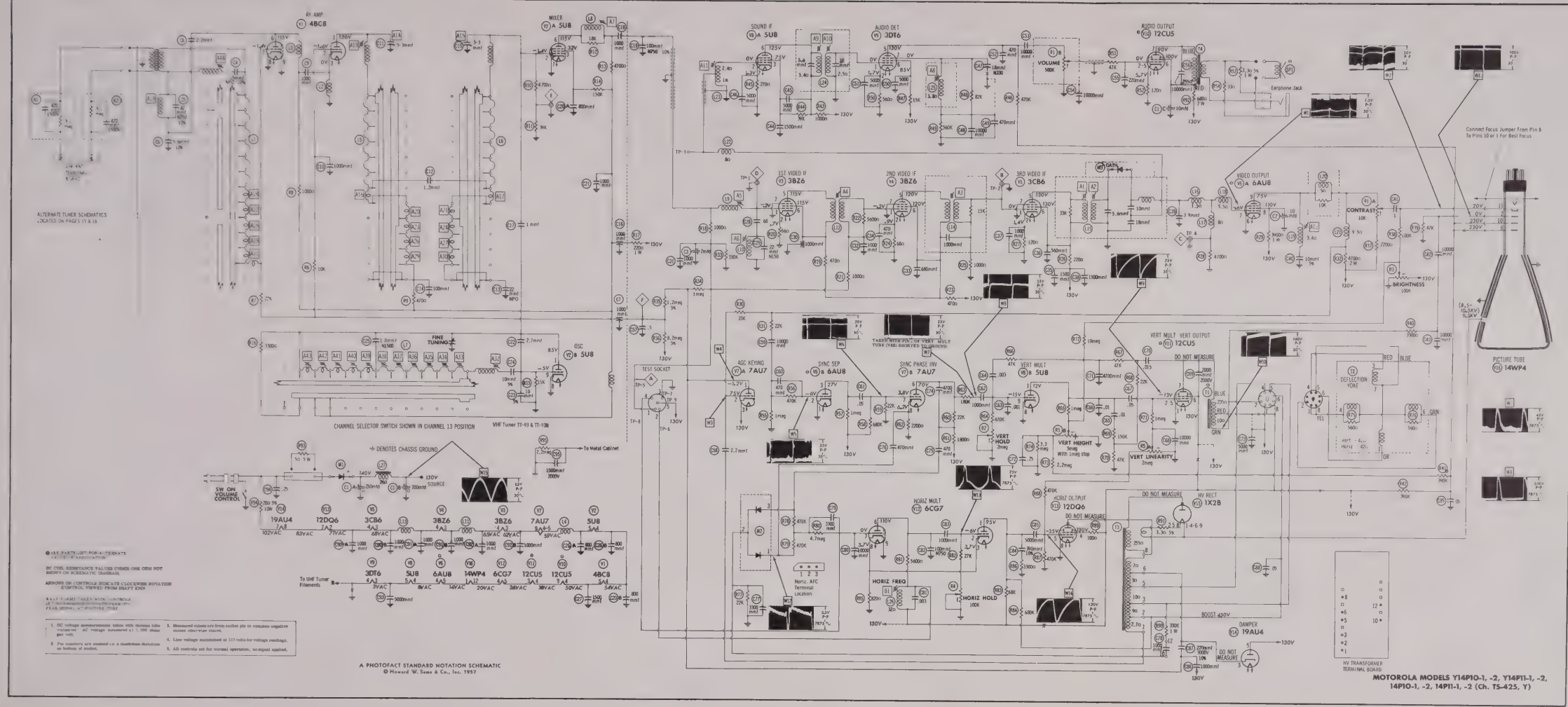
H112

DATE 9-57 SET 369 FOLDER 14


RF AMP V1 4BC8
MIXER V2 A 5U8
SOUND IF V8 A 5U8
AUDIO DET V9 3DT6
AUDIO OUTPUT V10 12CU5
1ST VIDEO IF V3 3BZ6
2ND VIDEO IF V4 3BZ6
3RD VIDEO IF V5 3CB6
VIDEO OUTPUT V6 A 6AU8
AGC KEYING V7 A 7AU7
SYNC SEP V8 B 6AU8
SYNC PHASE INV V7 B 7AU7
VERT MULT V8 B 5U8
VERT MULT VERT OUTPUT V11 12CU5
HORIZ MULT V12 6CG7
HORIZ OUTPUT V13 12DQ6
HV RECT V15 1X2B
DAMPER V14 19AU4
PICTURE TUBE V16 14WP4
OSC V7 B 5U8
TEST SOCKET
VOLUME
CONTRAST
BRIGHTNESS
VERT HOLD
VERT HEIGHT
VERT LINEARITY
HORIZ FREQ
HORIZ HOLD
FINE TUNING
DENOTES CHASSIS GROUND
ALTERNATE TUNER SCHEMATICS LOCATED ON PAGES 15 & 16
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION
VHF Tuner TT-93 & TT-93B
To Metal Cabinet
To UHF Tuner Filaments
ON VOLUME CONTROL
SOURCE
Earphone Jack
Connect Focus Jumper From Pin 6 To Pins 10 or 1 For Best Focus
DEFLECTION YOKE
HV TRANSFORMER TERMINAL BOARD
DO NOT MEASURE
BOOST 630V
TAKEN WITH PIN OF VERT MULT TUBE (V8B) SHORTED TO GROUND
Horiz. AFC Terminal Location
DC COIL RESISTANCE VALUES GIVEN ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
1. DC voltage measurements taken with vtvm from socket pin to common negative unless otherwise stated.
2. Pin numbers are counted i.e. a clockwise direction as bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation, no signal applied.

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MOTOROLA MODELS Y14P10-1, -2, Y14P11-1, -2, 14P10-1, -2, 14P11-1, -2 (Ch. TS-425, Y)

TUBE PLACEMENT CHART

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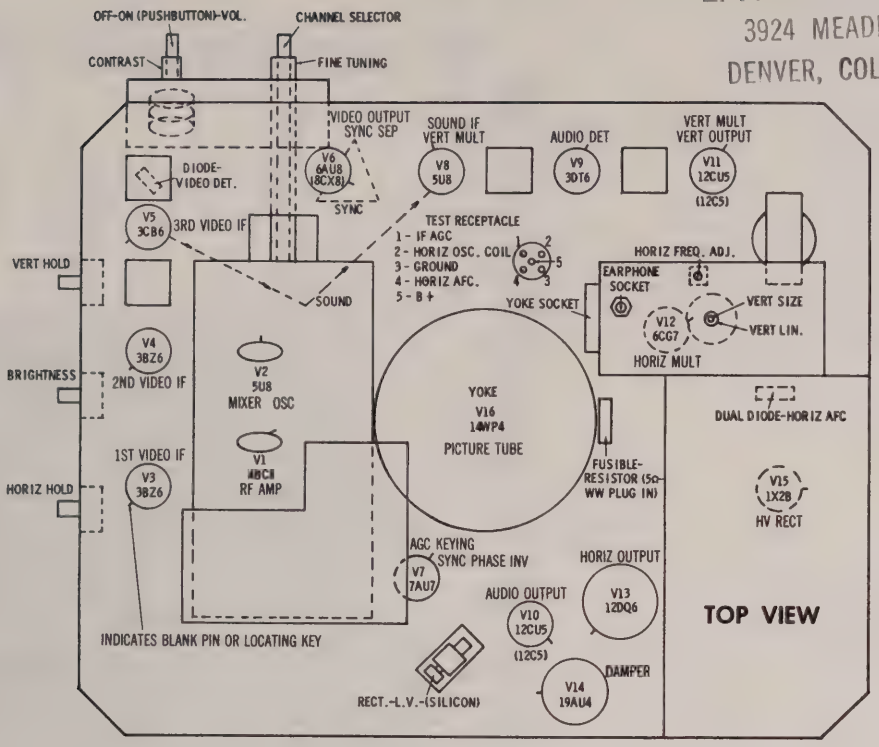


TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

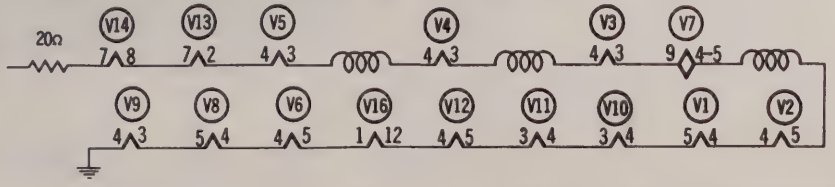
POWER SUPPLY FAILURE
No raster, no sound - Fusible Resistor (R93), Rectifier (M1)

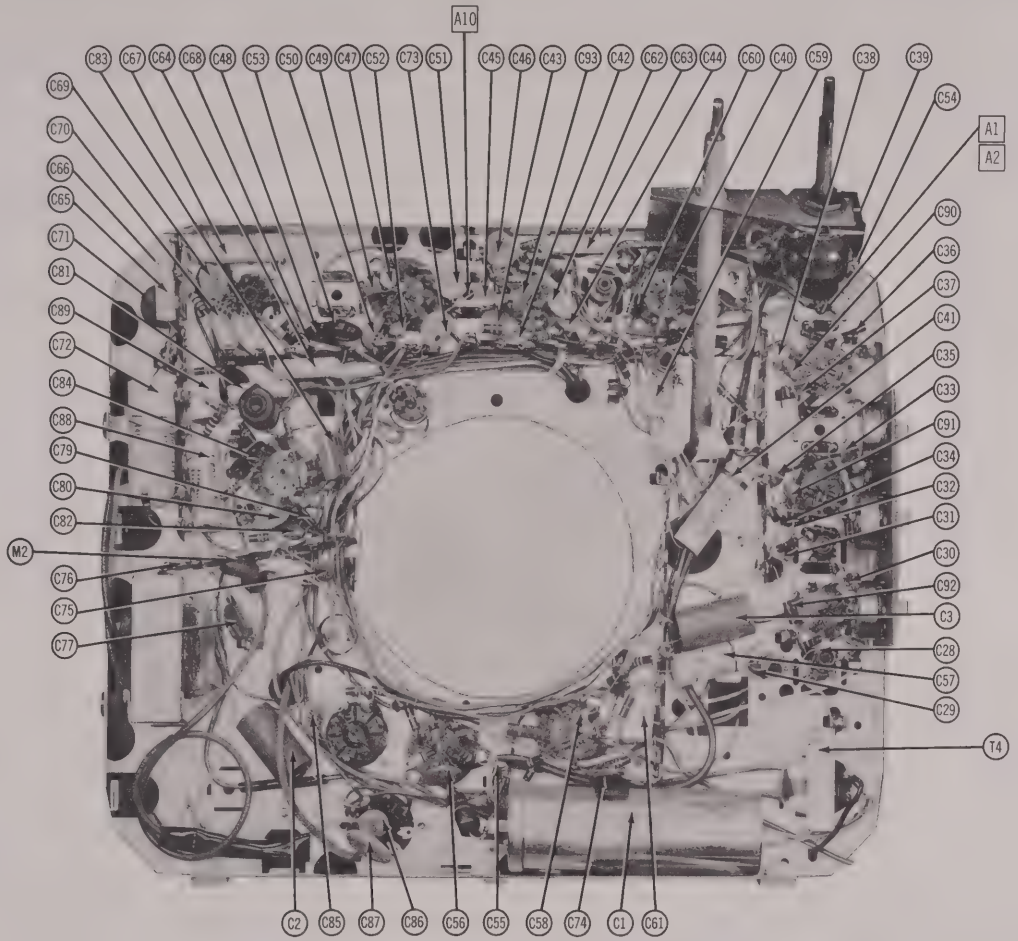
LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V3, V4, V5, Diode (M3)
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V16
Has pic, no sound - V8, V9, V10
Overloaded picture - V7

SYNC FAILURE
No vert. sync - V6, V7
No horiz. sync - V6, V7, Diode (M2)
No vert. or horiz. sync - V6, V7

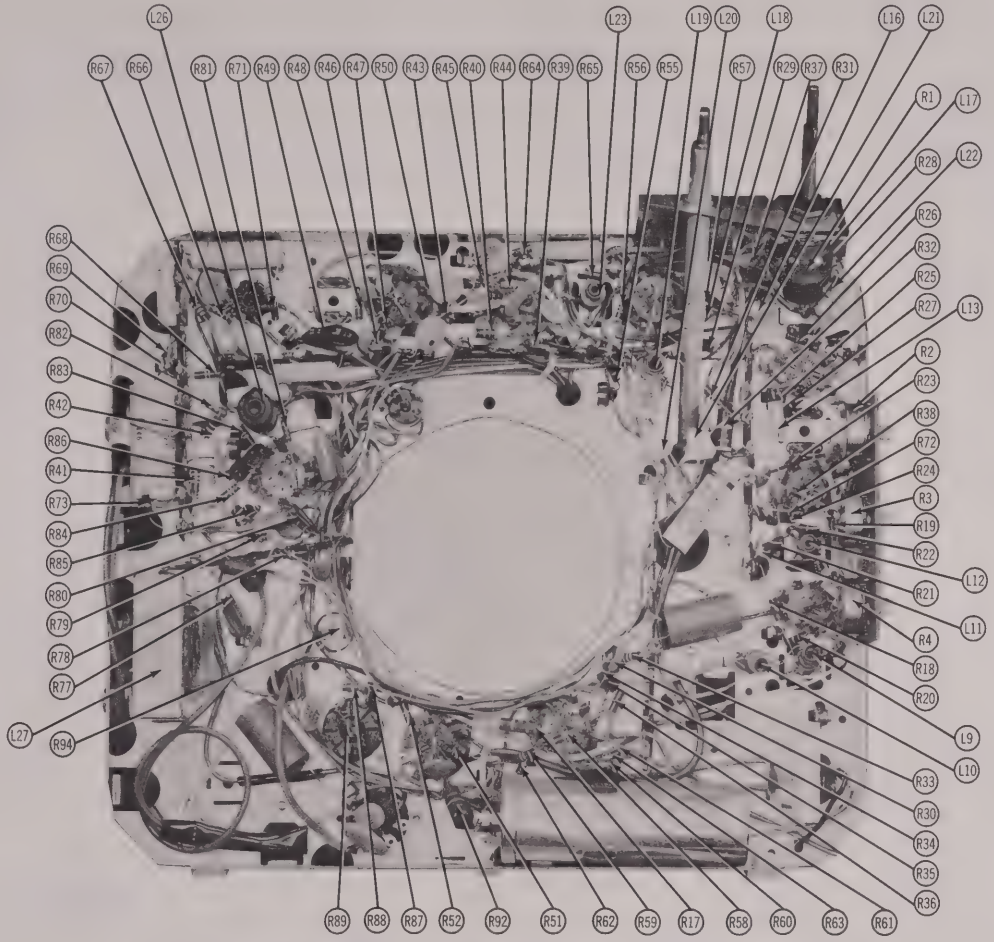
SWEEP FAILURE
No raster, has sound - M2, V12, V13, V14, V15, V16
No vertical deflection - V8, V11
Poor vert. linearity or foldover - V8, V11
Poor horiz. linearity or foldover - V12, V13, V14
Narrow picture - V12, V13, V14, M1
Vert. off freq. - V8, V11
Horiz. off freq. - V12

This receiver employs tubes used in a series filament network, an open filament in any tube in the series will cause the set to be inoperative. (See circuit below).





CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION



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CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT

VIDEO IF ALIGNMENT

Unplug the deflection yoke
Connect the negative lead of a 4 ½ volt bias supply to point ◈ Positive to chassis
Disable the tuner oscillator by connecting a short from pin 9 (grid) of the 5U8 (V3) to tuner chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Detune all stags (Al thru A7) by turning counter clockwise except A3 and A5. Turn these two clockwise

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to point ◈ Low side to chassis.	44.0MC (10MC Swp)	41.25MC 43.75MC	Any non-interfering channel	Vert. Amp thru 47K to point ◈ Low side to chassis.	A1, A3	Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown.
2.	"	High side to point ◈ Low side to chassis	"	45.75MC	"	"	A3	Adjust for maximum gain and symmetry of response similar to Fig. 2 with markers as shown
3.	"	"	"	43.25MC	"	"	A4	Adjust for maximum gain and symmetry response similar to Fig. 3 with markers as shown. If curve is tilted retouch A1 and A3.
4.	"	High side to point ◈ Low side to chassis.	"	46.75MC	"	"	A5	Adjust for maximum gain and symmetry of response similar to Fig. 3 with markers as shown
5.	"	"	"	41.25MC	"	"	A6	Adjust to place 41.25MC marker in trap notch (See Fig. 3).
6.	"	"	"	43.25MC	"	"	A7	Adjust for flat response (Fig. 3). If necessary, repeat steps 4, 5 and 6 to obtain desired response.

SOUND IF ALIGNMENT

Plug deflection yoke back into socket
Turn the set on and tune in a TV station.
Adjust all controls for a normal picture.
Using a strong TV signal, adjust A8 for maximum volume with MINIMUM distortion.
Reduce the signal strength by using an attenuator or disconnecting the antenna and adjust A9 and A10 for maximum sound and MINIMUM distortion.
Using the same weak signal (below limiting level of the SDT9) adjust All for maximum sound and MINIMUM distortion.
If the sound is not clear at this point, repeat adjustments.

4.5MC TRAP ALIGNMENT

Tune to a strong TV signal and advance the contrast control. Check raster for 4.5MC beat interference in the picture. Adjust A12 for MINIMUM beat interference in the picture.

VHF RF AND MIXER ALIGNMENT

Unplug the deflection yoke
Connect a short between point ◈ and chassis.
Remove the tuner cover
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Preset A13, A14 and A15 at center of their rnge.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Two 130Ω Carbon Resistors	Across VHF antenna terminals with 130Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 47K to point ◈ Low side to chassis.	A13	Adjust for maximum gain and symmetry of response similar to Fig. 4 with markers as shown
8.	"	"	177MC	175.25MC 179.75MC	7	"	A14, A15	Adjust for maximum gain and symmetry of response similar to Fig. 4 with markers as shown. Repeat steps 7 and 8, if necessary.
9.	"	"	85MC (10MC Swp)	83.25MC 87.75MC	6	"	*A16, *A17, A18	Check for response similar to Fig 5. If necessary, adjust in numerical sequence (by compressing or expanding coil turns). Adjust coils whose "A" numbers are preceded by (*) for proper marker positions. Adjust others for maximum gain and proper tilt.
10.	"	"	"	"	"	"	A19	Adjust until A19 starts to pull down the marker on the sound side of curve.
11.	"	"	79MC (10MC Swp)	77.25MC 81.75MC	5	"	*A20, *A21, A22	Check for response similar to Fig. 5. If necessary, adjust in numerical sequence (by compressing or expanding coil turns). Adjust coils whose "A" numbers are preceded by (*) for proper marker position. Adjust others for maximum gain and proper tilt.
13.	"	"	69MC (10MC Swp)	67.25MC 71.75MC	4	"	*A23, *A24, A25	"
13.	"	"	63MC (10MC Swp)	61.25MC 65.75MC	3	"	*A26, *A27, A28	"
14.	"	"	57MC (10MC Swp)	55.25MC 59.75MC	2	"	*A29, *A30, A31	"

FIG. 1

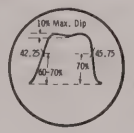


FIG. 2

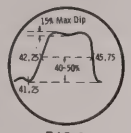


FIG. 3

FIG. 4A

FIG. 4B

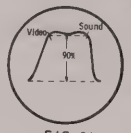


FIG. 5A

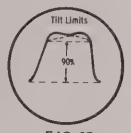


FIG. 5B

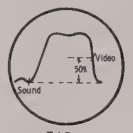


FIG. 6

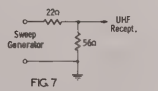


FIG. 7

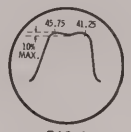


FIG. 8

VHF OSCILLATOR ALIGNMENT

Tuner cover must be in place.
Use a non-metallic alignment tool.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the center of its range.
Use only enough sweep generator output to provide a usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
15.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 47K to point ◈. Low side to chassis.	A33	Adjust to place sound marker in trap notch as in Fig. 6. Video marker should fall at 80%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A33	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A34	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A35	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A36	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A37	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A38	
			83MC (10MC Swp)	83.25MC 87.75MC	6		A39	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A40	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A41	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A43	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A43	

44.9MC TRAP ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
16.	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 130Ω in each lead.	44.9MC (10MC Swp)	Not used	3	Vert. Amp. thru 47K to point ◈. Low side to chassis.	A44	Adjust until its effect is below the response curve by for MINIMUM at interference frequency).

UHF IF ALIGNMENT

Unplug the UHF tuner output cable from the VHF tuner.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

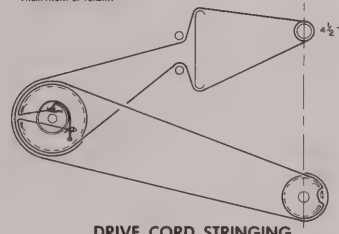
	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
17.	Fig. 7	High side to UHF input receptacle thru network (Fig. 7). Low side to chassis.	44.0MC (10MC Swp)	41.25MC 45.75MC	UHF	Vert. Amp. thru 47K to point ◈. Low side to chassis.	A45, A46, A47	Adjust A45 and A46 for proper marker positions and A47 for maximum gain and proper tilt. (Fig. 8).

UHF TUNER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE St.
DENVER, COLORADO

START RE-STRINGING WITH LARGE UHF PULLEY IN MAX COUNTER-CLOCKWISE POSITION (AS VIEWED FROM FRONT OF TUNER).

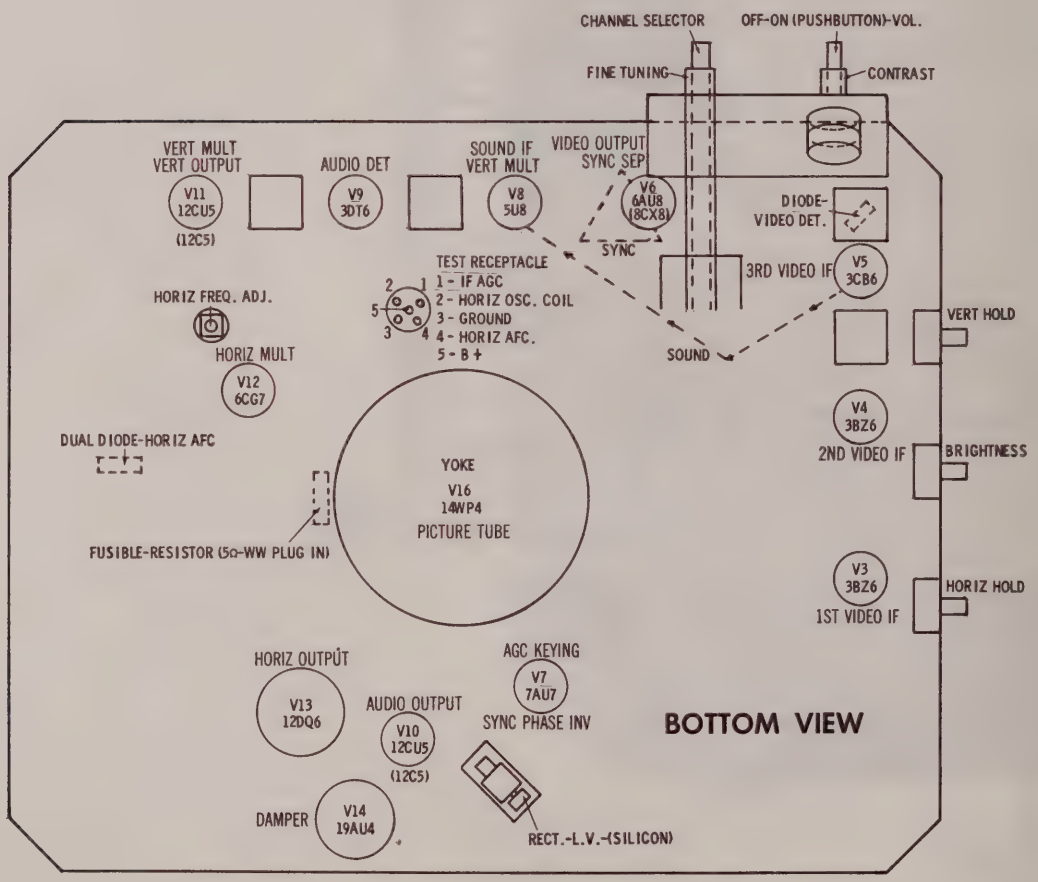


DRIVE CORD STRINGING

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	4BC8	†700Ω	1.8Meg	.1Ω	13.5Ω	12.5Ω	†1200Ω	1.8Meg	0Ω	0Ω
V2	5U8	†3500Ω	44K	†150K	13.5Ω	15Ω	†4900Ω	0Ω	0Ω	15K
V3	3BZ6	280K	56Ω	16Ω	17Ω	†960Ω	†960Ω	0Ω		
V4	3BZ6	280K	68Ω	17Ω	18Ω	†500Ω	†500Ω	0Ω		
V5	3CB6	1000Ω	120Ω	18Ω	19Ω	†250Ω	†250Ω	0Ω		
V6	6AU8	0Ω	1.5Meg	†1Meg	2Ω	3.5Ω	0Ω	4700Ω	†3900Ω	†3300Ω
V7	7AU7	1.1Meg	†35K	†0Ω	15Ω	15Ω	†24K	20K	2200Ω	16Ω
V8	5U8	2.3Meg	3.4Ω	†40K	2Ω	1Ω	†1000Ω	270Ω	0Ω	• 750K
V9	3DT6	2.5Ω	560Ω	1Ω	0Ω	†650K	†15K	560K		
V10	12CU5	120Ω	47K	10Ω	12.5Ω	47K	†700Ω	†950Ω		
V11	12CU5	0Ω	• 1.6Meg	7.5Ω	10Ω	• 1.6Meg	†26Ω	†260Ω		
V12	6CG7	‡320K	• 50K	820Ω	5Ω	7.5Ω	†5600Ω	5Meg	820Ω	0Ω
V13	12DQ6	TP	19Ω	TP	†126Ω	390K	TP	22Ω	0Ω	TOP CAP ‡7Ω
V14	19AU4	NC	NC	330K	TP	†26Ω	TP	25Ω	22Ω	
V15	1X2B	PINS 1 THRU 9 HAVE INFINITE RESISTANCE								TOP CAP ‡262Ω
V16	14WP4	3.5Ω	47K	PIN 6 ‡250K	PIN 10 ‡250K	PIN 11 • 110K	PIN 12 5Ω			

† MEASURED FROM OUTPUT OF M1.
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
‡ MEASURED FROM PIN 3 OF V14.
¶ THIS READING CAN VARY. CONTROL SET FOR NORMAL OPERATION.
TP TIE POINT
NC NO CONNECTION



TUBE PLACEMENT CHART

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CHASSIS TOP VIEW

MOTOROLA MODELS Y14P10-1, -2, Y14P11-1, -2, 14P10-1, -2, 14P11-1, -2 (Ch. TS-425, Y)

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	RF Amplifier	6BC5	
V2	Mixer - Osc.	5L6	
V3	1st Video IF Amp.	3B26	
V4	2nd Video IF Amp.	3B26	
V5	3rd Video IF Amp.	3C66	
V6	Video Output-Sync Sep.	6AL5	Note 1
V7	AGC-Keying-Sync Phase Inv	7AU7	
V8	Sound IF-Vert Multi.	5U8	

ITEM No	USE	TYPE	NOTES
V9	Audio Det.	3DT8	
V10	Audio Output	12CU5	Note 3
V11	Vert Multi.-Vert Output	12CU5	Note 3
V12	Horiz. Multi.	6CB7	
V13	Horiz. Output	12DQ6	
V14	Damper	18AU4	
V15	HV Rectifier	1X2B	

Note 1. A 6CB5 may be used in some versions.
Note 2. A 12C5 may be used in some versions.

PICTURE TUBE

ITEM No	REPLACEMENT DATA			NOTES
	MOTOROLA PART No	GENERAL ELECTRIC PART No	SYLVANIA PART No	
V-8	19VP4			

ELECTROLYTIC CAPACITORS

ITEM No	RATING CAP	RATING VOLT	REPLACEMENT DATA MOTOROLA PART No	AEROVOX PART No	CORNELL-DUBILIER PART No	MALLORY PART No	PYRAMID PART No	SANGAMO PART No	SPRAGUE PART No	NOTES
C1A	+250	150	23D7405-90	PRS-Q12	XCV429	WT302	CDD-T-1015	D-095 *MT-1510		R22L3 *
B	+200	150								
C	10	150								
C2	10	10	23K7439-00	PRS250V10	BBR10-150	TC42	TD-10-150	MT-1510	TVA-1406	
C3	2	10	23A7333-05	PRS50V2	BBR2-50	TC302	TD-2-25	MT-0502	TVA-1201	

* Non catalog item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	15		23R12331	MPO-SI 15	TCZ-15	CD6C15C	TCO-15		5TCC-C15	NPO 10%
C5	47		23R14307	MPO-SI 47	TCZ-47	CD6C47U	TCT-47	MT-5647	5TCU-C47	N750 10%
C6	5.6		23A7375S							-10%
C7	1000		23A7369D	EF-021	MFT-1000				503C-D1	
C8	5.3		23R15946	SPD-001 2.3	CD6V23C	TCO-2.3			5TCC-V23	
C9	1000		23R15386	SPD-001	BYA6DL	ED-1000	DC831		5HK-D1	
C10	1000		23R15386	SPD-001	BYA6DL	ED-1000	DC831		5HK-D1	
C11	.5-3		23R7359S		539-3		2115-D	CT3654		
C12	1.7		23R9195S							
C13	33	750	23R14554							NPO
C14	100		23R1057 7	SI 100	D6-101	L7GT1	GP-100	UC-631	5GA-T1	
C15	5-3		23R7358S		539-3		2115-D	CT3654		
C16	1000		23A7369D	EF-021	MFT-1000				503C-D1	
C17	1.0		23R14071	MPO-SI 1.0	TCZ-1				5TCC-V1	
C18	1000		23R15386	SPD-001	DD-101	BYA6DL	ED-1000	DC831	5HK-D1	
C19	100		23R15371	MTO-SI 100	TCO-100	CD6T15U	TCT-100	MT-531	5TCU-T1	N750 10%
C20A	800		23R4009 43	BPD-0008	DD-801	L10T8	ED-800		5GA-T8	
B	800			BPD-0008	DD-801	L10T8	ED-800		5GA-T8	
C21	1000		23R15386	SPD-001	DD-101	BYA6DL	ED-1000	DC831	5HK-D1	
C22	3.7		23R3569							
C23	10		23R4008 3	MPO-SI 10	TCZ-10	CD6C10C	TCO-10	2T-541	5TCC-C1	5%
C24	10		23R15698	MPO-SI 10	TCZ-10	CD6C1C	TCO-10	2T-541	5TCC-C1	5% N1500
C25	1.0		23R14551							
C26A	800		23R4009 43	BPD-0008	DD-801	L10T8	ED-800		5GA-T8	
B	800			BPD-0008	DD-801	L10T8	ED-800		5GA-T8	
C27	1000		23R15386	SPD-001	DD-101	BYA6DL	ED-1000	DC831	5HK-D1	
C28	.68		23R15695		TCZ-.68		TCO-.68			
C29	33		23R12659							N750
C30	1000		23R7385Z	EF-021	MFT-1000				503C-D1	
C31	1000		23R15386	SPD-001	DD-101	BYA6DL	ED-1000	DC831	5HK-D1	
C32	1000		23R15386	SPD-001	DD-101	BYA6DL	ED-1000	DC831	5HK-D1	
C33	680		23R4012 4	BPD-00068	DD-681	BYA10T68	ED-680	UC-5365	5GA-T68	
C34	470		23R13797	BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C35	1500		23R12349	BPD-0015	DD-152	BYA10D15	ED-0015	DC8215	5HK-D15	
C36	1500		23R15313	BPD-0015	DD-152	BYA10D15	ED-0015	DC8215	5HK-D15	
C37	1000		23R4012 4	BPD-00068	DD-681	BYA10T68	ED-680	UC-5365	5GA-T68	
C38	1500		23R15313	BPD-0015	DD-152	BYA10D15	ED-0015	DC8215	5HK-D15	
C39	5.9		23R15953							
C40	10		23R14553		D6-100	CD6C1C	TCO-10	2T-541	5TCC-C1	5%
C41	300	600	6BC5173	P288H-1	GP-300	CUB2P1			6TM-P5	
C42	10000		23R15948	BPD-01	DD-103	BYA6EL	ED-01	DC811	5HK-S1	
C43	10000		23R15948	BPD-01	DD-103	BYA6EL	ED-01	DC811	5HK-S1	
C44	1500		23R12498	BPD-0015	DD-152	BYA10D15	ED-0015	DC8215	5HK-D15	
C45	5000		23R15313	BPD-005	DD-502	BYA10D5	ED-005	DC825	5HK-D5	
C46	5000		23R15312	BPD-005	DD-502	BYA10D5	ED-005	DC825	5HK-D5	
C47	18		23R12531							N330
C48	10000		23R15948	BPD-01	DD-103	BYA6EL	ED-01	DC811	5HK-S1	
C49	470		23R14021	BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C50	5000		23R15312	BPD-005	DD-502	BYA10D5	ED-005	DC825	5HK-D5	
C51	5000		23R15312	BPD-005	DD-502	BYA10D5	ED-005	DC825	5HK-D5	
C52	470		23R13797	BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C53	10000		23R15948	BPD-01	DD-103	BYA6EL	ED-01	DC811	5HK-S1	
C54	10000		23R15948	BPD-01	DD-103	BYA6EL	ED-01	DC811	5HK-S1	
C55	220		23R14015	BPD-00022	DD-221	L10T22	ED-220	UC-5322	5GA-T22	
C56	10000		23R12946	BPD-01	DD-103	BYA6EL	ED-01	DC811	5HK-S1	
C57	5.3	100	23R13076	P288H-1	GP-300	CUB2P1		GEM-205	6TM-P5	
C58	2.3		23R15946	MPO-SI 2.3	TCZ-2R2	CD6V23C	TCO-2.3		5TCC-V22	
C59	10000		23R15948	BPD-01	DD-103	BYA6EL	ED-01	DC811	5HK-S1	
C60	470		23R13797	BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C61	.05	600	6BC5165	BPD-05	DF-503	CUB6S5		GEM-615	6TM-S5	
C62	.05	600	6BC5165	BPD-05	DF-503	CUB6S5		GEM-615	6TM-S5	
C63	.001	300	23R7408D	BPD-102	DD-102	CUB6DL	GP-1000	GEM-632	6TM-D1	
C64	.002	600	23R7374A	P488H-005	D6-202	CUB6D2	GP-2000	GEM-623	6TM-D2	
C65	.01	600	23R7395D	BPD-01	D6-103	CUB6S1	GP-10000	GEM-611	6TM-S1	
C66	.01	600	23R7395D	BPD-01	D6-103	CUB6S1	GP-10000	GEM-611	6TM-S1	
C67	.05	600	6BC5167	BPD-05	DF-503	CUB6S5		GEM-615	6TM-S5	
C68	10000		23R15798	BPD-01	DD-103	BYA6EL	ED-01	DC811	5HK-S1	
C69	3000	3000	23R15399		D3D0-303	HVC30D3				
C70	.015	300	23R13256	BPD-015	DD6-153	CUB6S15	ED-015	GEM-615	6TM-S15	
C71	4700		23R12649	BPD-00047	DD-472	BYA10D47	ED-0047	UC-5347	5HK-D47	
C72	.25	600	6BC5256	P688N-25		CUB6P25		GEM-6025	6TM-P25	
C73	5000		23R15399	BPD-005	DD-502	BYA10D5	ED-005	DC825	5HK-D5	
C74	4700		23R12649	BPD-00047	DD-472	BYA10D47	ED-0047	UC-5347	5HK-D47	
C75	470		23R13797	BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C76	470		23R13797	BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C77	3300		23R13042	BPD-0033	DD-332	BYA10D33	ED-0033	UC-5333	5HK-D33	

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No	RATING CAP	RATING VOLT	REPLACEMENT DATA MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C78	.000		23R14027	BPD-001	DD-102	BYA6DL	ED-1000	DC831	5HK-D1	
C79	3300		23R12422	BPD-0033	DE-332	BYA10D33	ED-0033	UC-5333	5HK-D33	
C80	10000		23R14275	BPD-01	DD-103	BYA6EL	ED-01	DC811	5HK-S1	
C81	.003	200	6BC4761	P488H-003	D6-302	CUB6D3	GP-3000	GEM-632	6TM-D3	
C82	100		23R4005 7	NT50-SI 100	TCN-100	CD7T1U	TCT-100	NT-521	5TCU-T1	N750
C83	1000		23R6661	1467-001	D6-101	L6TG2	ED-1000	DC831	5GA-T1	
C84	240		23R7357S		D6-241	L10T39	ED-390		MS-339	10%
C85	5000		23A7382SB	BPD-006	DD-502	BYA10D6	ED-006	DC826	5HK-D6	
C86	1000		23R14027	BPD-001	DD-102	BYA6DL	ED-1000	DC831	5HK-D1	
C87	220	3000	23R12565	HVD-30-220	DD30-220	HVB30T22	HD3-220	DC30322	30QA-T22	10%
C88	05	600	6BC5256	BPD-05	DF-503	CUB6S5		GEM-615	6TM-S5	
C89	05	600	6BC5256	BPD-05	DF-503	CUB6S5		GEM-515	6TM-S5	
C90A	1000		23R4009 37	BPD-1X001	DD3-103	BYC6DDL	ED3-001	DC0631	5HK-3D1	
B	1000									
C91A	1000		23R4009 37	BPD-3X001	DD3-103	BYC6DDL	ED3-001	DC0631	5HK-3D1	
B	1000									
C92A	1000		23R4009 37	BPD-3X001	DD3-103	BYC6DDL	ED3-001	DC0631	5HK-3D1	
B	1000									
C93	5000		23A7382SB	BPD-006	DD-502	BYA10D6	ED-006	DC825	5HK-D6	
C94	25	400	6BC2788	P488N-25		CUB4P25		GEM-4025	6TM-P25	
C95	1500	2000	23R13431	HVD-30-1500	DD30-152	BYD20D15	HD3-1500	DC30153		

CONTROLS

ITEM No	RATING RESISTANCE	RATING WATTS	MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	10K	1	18R742673	F1-53	RTV-638		USUB	Contrast
B	500K			R3-42	Not Reg.		Not Reg.	Volume
C	Switch			S3-1	Not Reg.		Not Reg.	
R2A	2Meg	1	18K740682	B-75	A47-2Meg-	GU-139	TA9L	Vert. Hold
B	Shaft			Not Reg.	K38-3	Not Reg.	Not Reg.	
R3A	100K	1	18C740680	B-62	A47-100K-6	GU-135	TA9L	Brightness
B	Shaft			Not Reg.	K38-3	Not Reg.	Not Reg.	
R4A	100K	1	18C740680	B-62	A47-100K-6	GU-135	TA9L	Horiz. Hold
B	Shaft			Not Reg.	K38-3	Not Reg.	Not Reg.	
R5A	2Meg	1	18B741520	F1-57	*		UB1646	Vert. Lin.
B	1Meg			R3-83 *			TA9L	Vert. Height With 1Meg Stop

* Use a 1Meg resistor in series with the right hand terminal.
* Concentrikit Equivalent, K-5 Kit Base Elements & Shafts, BU-139, P6-021 (Panel)
BU-141, BU-138 (Rear) *

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No	RATING OHMS	RATING WATT	REPLACEMENT DATA MOTOROLA PART No.	IRC PART No.	NOTES
R6	10K		6R6064	BTS-10K	
R7	22K		6R6038	BTS-22K	
R8	10000		6R6329	BTS-1000	
R9	4700		6R3949	BTS-470	
R10	47000		6R6030	BTS-4700	
R11	33K		6R6407	BTS-33K	
R12	18K		6K323946	BTS-18K	
R13	47000		6R6030	BTS-4700	
R14	150K		6R6398	BTS-150K	
R15	15K		6R3119	BTS-15K	
R16	33000		6R6331	BTS-3300	
R17	2200	1	6R5389	BTA-220	
R18	10000		6R6329	BTS-1000	
R19	470		6R3949	BTS-470	
R20	560		6R3454	BTS-56	
R21	1000		6R6329		
R22	56000		6R6417	BTS-56K	
R23	470		6R3949	BTS-470	
R24	680		6R3939	BTS-68	
R25	10000		6R6329	BTS-1000	
R26	2200		6R3953	BTS-220	
R27	1200		6R3951	BTS-121	
R28	47000		6R6030	BTS-4700	
R29	39000	1	6R5518	BTA-3900	
R30	33K		6R6407	BTS-33K	
R31	22K		6R6397	BTS-22K	
R32	47000	2	6K319928	BTH-470-2	
R33	330K		6R6398	BTS-330K	
R34	1Meg		6R6049	BTS-1Meg	
R35	1.2Meg±2%		6K124495		
R36	8.2Meg±2%		6K125894		
R37	22000		6R6069	BTS-2200	
R38	100K		6R6070	BTS-100K	
R39	47K		6R6037	BTS-47K	
R40	3300		6R6581	BTS-3300	
R41	390K		6R6046	BTS-390K	
R42	390K		6R6046	BTS-390K	
R43	10000		6R6329	BTS-1000	
R44	56K		6R6407	BTS-56K	
R45	2700		6R6432	BTS-270	
R46	470K		6R6033	BTS-470K	
R47	15K		6R6477	BTS-15K	
R48	22K		6R6044	BTS-22K	
R49	100K		6R6067	BTS-100K	
R50	3300		6R6581	BTS-330	

ITEM No	RATING OHMS	RATING WATT	REPLACEMENT DATA MOTOROLA PART No.	IRC PART No.	NOTES
R51	47K		6R6056	BTS-47K	
R52	120		6R6581	BTS-120	
R53	3.3Ω 5%	1	17K649412		
R54	33Ω		6R2056	BTS-33	
R55	1Meg		6R6239	BTS-1Meg	
R56	470K		6R6377	BTS-470K	
R57	1Meg		6R6049	BTS-1Meg	
R58	680K		6R6475	BTS-680K	
R59	22K		6R6397	BTS-22K	
R60	33K		6R6397	BTS-33K	
R61	18000		6R3089	BTS-1800	
R62	22000		6R6069	BTS-2200	
R63	68K		6R6644	BTS-68K	
R64	470K		6R6377	BTS-470K	
R65	1Meg		6R6049	BTS-1Meg	
R66	47K		6R6048	BTS-47K	
R67	47K		6R6048	BTS-47K	
R68	33K		6R6397	BTS-33K	
R69	150K		6R6398	BTS-150K	
R70	47K		6K105592	BTS-47K	
R71	1Meg		6R6048	BTS-1Meg	
R72	1.5Meg		6K23591	BTS-1.5Meg	
R73	2.2Meg		6R3927	BTS-2.2Meg	
R74	3.3Meg		6R2113	BTS-3.3Meg	
R75	560Ω		6K122802		
R76	560Ω		6K122802		
R77	33K		6R7397		
R78	470K		6R6377		
R79	470K		6R6377		
R80	4.7Meg		6R6648		
R81	560Ω		6R6017	BTS-5600	
R82	27K		6R6434	BTS-27K	
R83	68K		6R6047		
R84	680K		6R6475	BTS-680K	
R85	820Ω		6R6269	BTS-820	
R86	3300		6R6581	BTS-3300	
R87	470K		6R6377	BTS-470K	
R88	470K		6R6377	BTS-470K	
R89	100Ω		6R6018	BTS-100	
R90	330K	1	6R6717	BTA-330K	
R91	3.3Ω 5%		17K615412	BW1-3.3	
R92	680Ω	2	6K490015	BTS-680	
R93	1Ω	5	17K743118		
R94	20Ω 5%	10	17K739320		
R95	2.2Meg		6R3927	BTS-2.2Meg	

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Rom PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
T1	Vert Output	23R7432-A	Z1900 ① ②	A-2821		V314	A-8147	26S75 ① ②	A-10BX ① ③
T2	Yoke-Horiz.(74MM) (90)-Vert (40MM)	23R7430-A	DF-820 ②	MDF-92-6 ②	135DH-5/5	T90F10/43 ②	DY-16A ②	Y-16 ② ⑤	Y-41 & HW1 ⑤
M5	Rear cover and Centering Device	48A73145							YCI CLI
T3	Yoke Clamp	42A73617S							
	Yoke Wedge	42A73625T							
T5	Horiz. Output	23R7431-A ③							
	Primary Coil	36C74287A							
	Secondary Coil	36C74250T							

① Connect as auto transformer.
② Use 8 to 1 turn ratio.
③ Drill new mounting hole(s).
④ Connect same as original.
⑤ Use original rear cover and centering device.
⑥ Complete assembly.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI	IMPEDANCE SEC	REPLACEMENT DATA MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.	NOTES
T4	2700Ω	3-4Ω	23R7434-A	Z1103 ①	A-3038	A-3323	26S66 ①	S-13X	① Drill one new mounting hole. ② Tape tap on primary winding.

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA MOTOROLA PART No.	QUAM PART No.	NOTES
SP1	4"	PM	3-4Ω	50K743042 ①	4A07	① Alternate part number
				50K743049 ①	4A07	

COILS (RF-IF)

ITEM No.	USE	MOTOROLA PART No.	NOTES
L1	Ant. Coils	1V743064	Channel 3-13, includes complete wafer assy. C4, C5, and C6.
L2	RF Choke	34A743245	
L3	Neutr. Coil	34A738507	
L4	Fil. Choke	34K743527	
L5	RF Coils	1V743065	Channel 3-13, includes complete wafer assy. C13, C14, & R8.

ITEM No.	USE	MOTOROLA PART No.	NOTES
L6	Mixer Grid Coils	1V738069	Channel 3-13, includes complete wafer assembly and C13.
L7	Osc. Coils	1V743101	Channel 3-13, includes complete wafer assy. C5A and C5B.
L8	Mixer Plate Coil	34B740435	

ITEM No.	USE	MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L9	1st. Video IF	24K743780		17-4534	TV-131	
L10	4L 2SMC Trap	24K743966				
L11	Fil. Choke	24K730291		19-1001	BC-561	4804
L12	2nd. Video IF	24K743782		17-4532	TV-130	6119
L13	Fil. Choke	24K730291		19-1001	BC-561	4804
L14	3rd. Video IF	24C743788		17-5004 a		6234 a
L15	4th. Video IF & Det. Assembly	24C743797				
L16	RF Choke	24K737753		19-1009	BC-566	4813
L17	Shunt Peaking Coil	24K740017		19-3300	TV-190	6133
L18	Series Peaking Coil	24C738006		19-3180	TV-184	6180
L19	4.5 MC Trap	24K743273		30-1005 a		
L20	Series Peaking Coil	24K743284		19-3180 *	TV-184 *	6180 *
L21	Shunt Peaking Coil	24K738965		19-3300	TV-189	6138
L22	Resonant Choke	24K743727				
L23	1st. Sound IF	24D743788		17-4603		1470
L24	2nd. Sound IF	24D743946		17-3486	TV-119	6303
L25	Quadrator Coil	24D743949				1481

a Parallel secondary with 15K Resistor and replace .001MFD capacitor.
a Change parallel capacitor to series.
* Parallel with 10K Resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Rom PART No.	Thordorson PART No.	NOTES
L26	32Ω		1V743077		MWC-13					13-150 Millihenries

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE 10 CURRENT 1000 ~/s	MOTOROLA PART No.	REPLACEMENT DATA Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
L27	.310A	26Ω	18h.	25K740674	C-2096 ①	C-2098 ①	C-2328 ①	26C44	C-17X ①

① Drill one new mounting hole.

COMPONENT COMBINATIONS

ITEM No	USE	DESCRIPTION	MOTOROLA PART No.	REPLACEMENT DATA
K1	Ant. Isolation	470MMF@ 1500V, .3-1Meg	51B740235	Centralab RC-471
K2	Ant. Isolation	470MMF@ 1500V, .3-1Meg	51B740236	Centralab RC-471

PARTS LIST AND DESCRIPTIONS (Continued)

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT (Measured)	MOTOROLA PART No.	FEDERAL PART No.	GENERAL ELECTRIC PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	
M1 M2	.310A	42B743273 ①⑤ 48B742698 ③	1215 ③④	1N1007 ②⑥	3FS3 ① 1T1 ③④		M500	

① Silicon Type
② Germanium Type
③ Selenium Type
④ Two required
⑤ Holder Part #9A743258
⑥ Drill 3/16" mounting hole.

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		MOTOROLA PART No.	CBS PART No.	SYLVANIA PART No.	
M3		48C739300	1N60	1N60	Video Det. (Clipin)

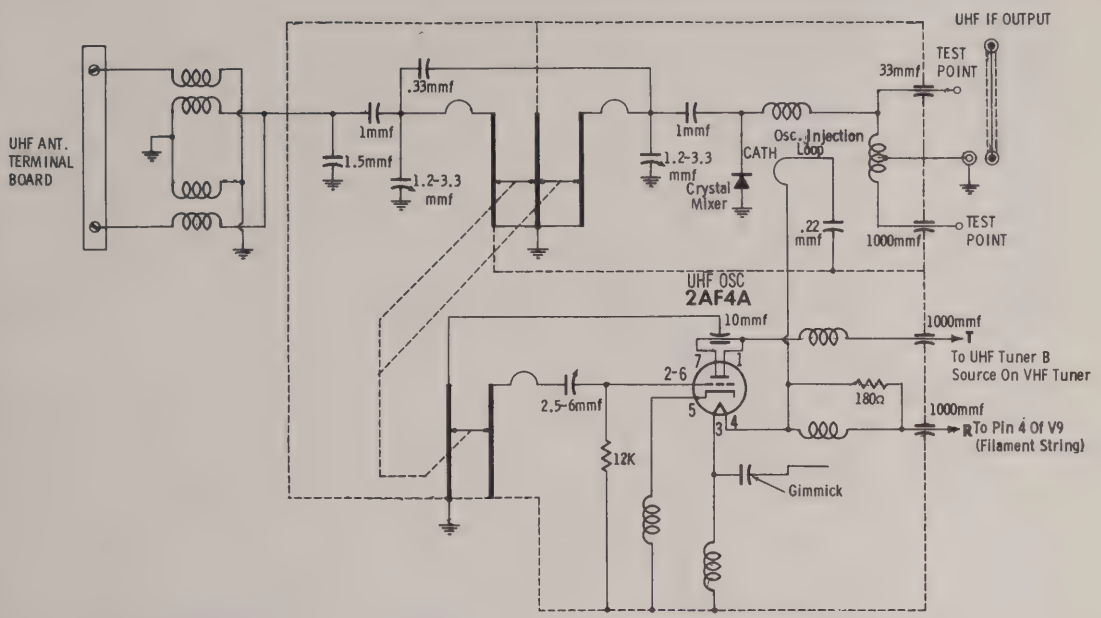
MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M4	Tuner		VHF (TT-93B) Chassis TS-425
	Tuner	1V743072	VHF (TT-93) Chassis TS-425
	Tuner	1V743093	VHF (TT-93Y) Chassis TS-425Y
	Tuner	77K742138	UHF Chassis TS-425Y
M5	Centering Device	48A721145	Includes Yoke Rear Cover

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Safety Glass	61C740184	Tinted, Plastic
Bezel	13E742622	White & Carnation, Models: 14P10-1, Y14P10-1
Bezel	13K742623	White & Citron, Models: 14P10-2, Y14P10-2
Bezel	13K742624	White & Gold, Models: 14P11-1, Y14P11-1
Bezel	13K742625	White & Blue, Models: 14P11-2, Y14P11-2
Knobs	36C742690	VHF Channel Selector, Models: 14P10-1, -2, 14P11-1, -2
Knobs	36C742873	VHF Channel Selector, Models: Y14P10-1, -2, Y14P11-1, -2
Knobs	34C742874	UHF Tuning & Dial, Models: Y14P10-1, -2, Y14P11-1, -2
Knobs	36C742689	Fine Tuning
Knobs	36B742692	On-Off-Volume
Knobs	36B742688	Brightness
Knobs	36B742691	Contrast
Knobs	36K744034	Vert Hold
Knobs	36K744035	Horiz. Hold
Cabinet	16F742495	Carnation, Model: 14P10-1
Cabinet	16K742496	Carnation, Model: Y14P10-1
Cabinet	16K742497	Citron, Model: 14P10-2
Cabinet	16K742498	Citron, Model: Y14P10-2
Cabinet	16K742499	White, Model: 14P11-1
Cabinet	16K742600	White, Model: Y14P11-1
Cabinet	16K742601	Blue, Model: 14P11-2
Cabinet	16K742602	Blue, Model: Y14P11-2
Handle	55E742268	Models: 14P10-1, -2, Y14P10-1, -2, 14P11-2, Y14P11-2
Handle	55K742157	Gold, Models: 14P11-1, Y14P11-1



A PHOTOFACT STANDARD NOTATION SCHEMATIC
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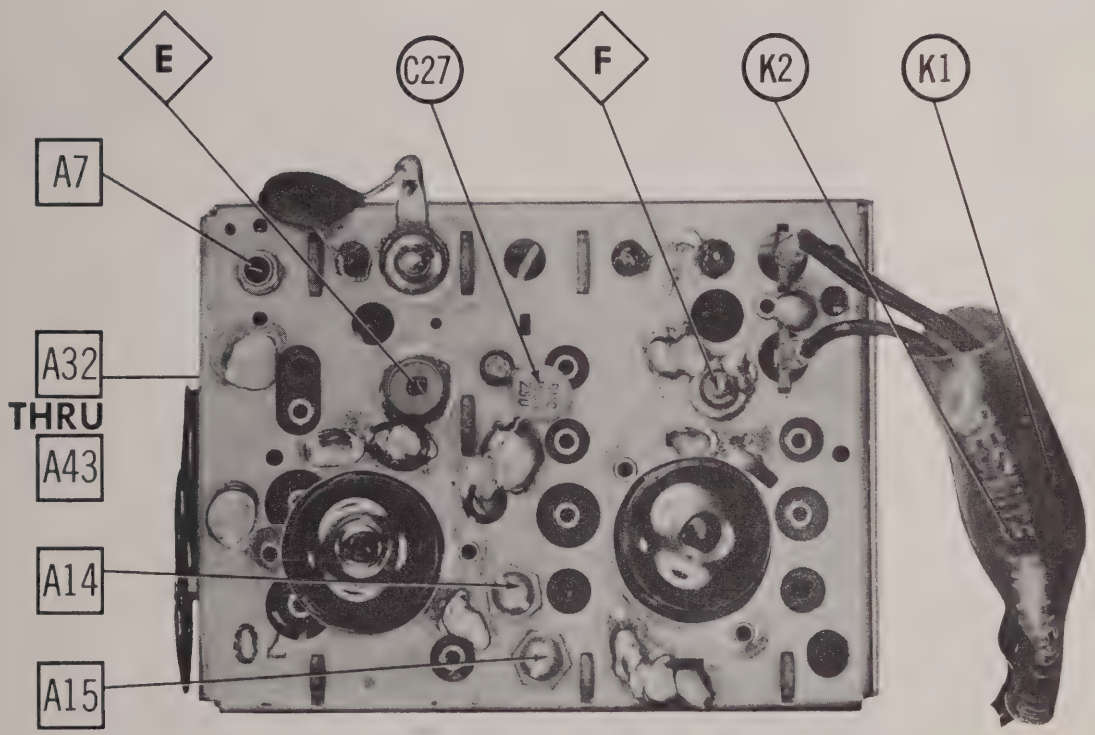
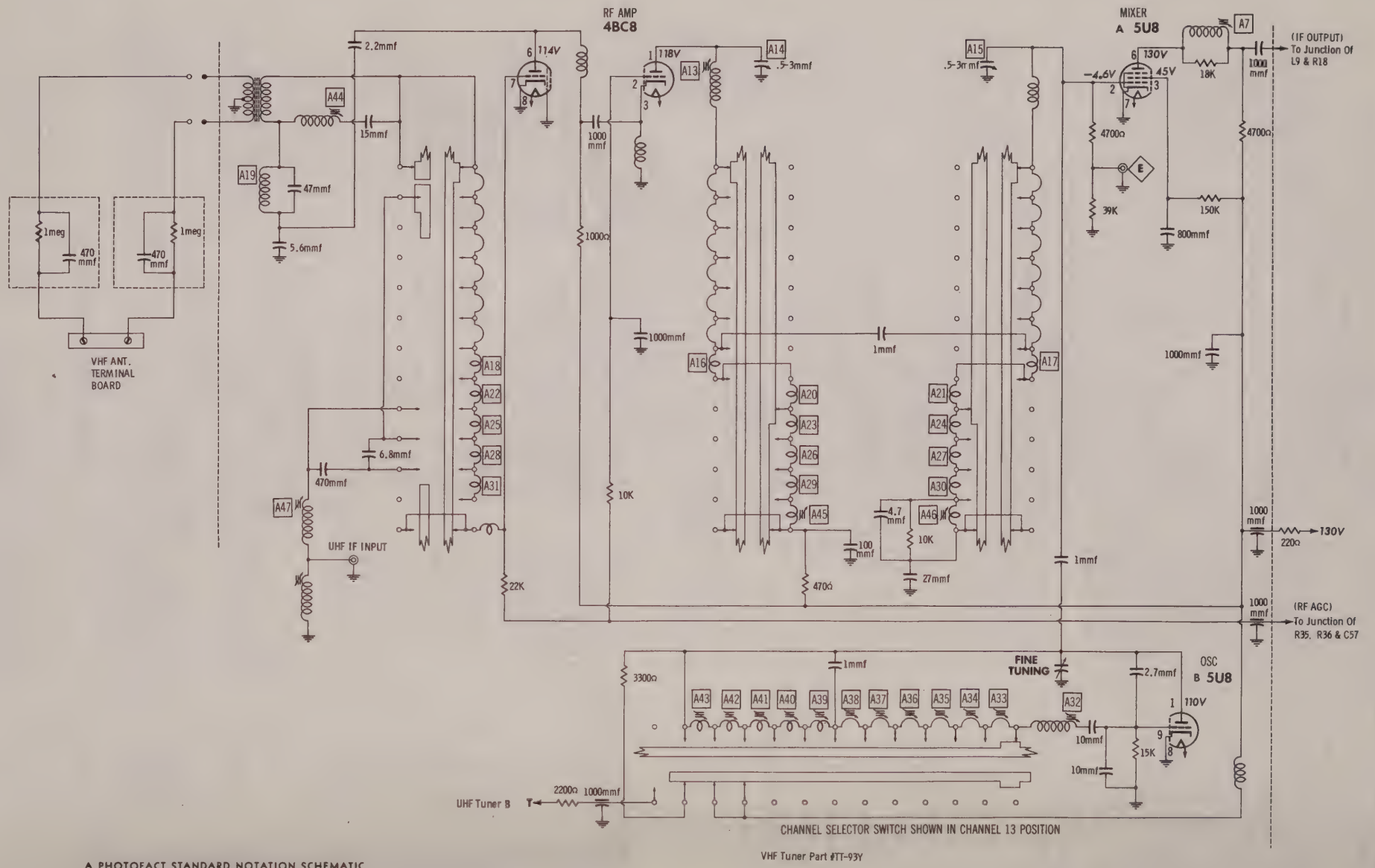
UHF Tuner Part #77K742138

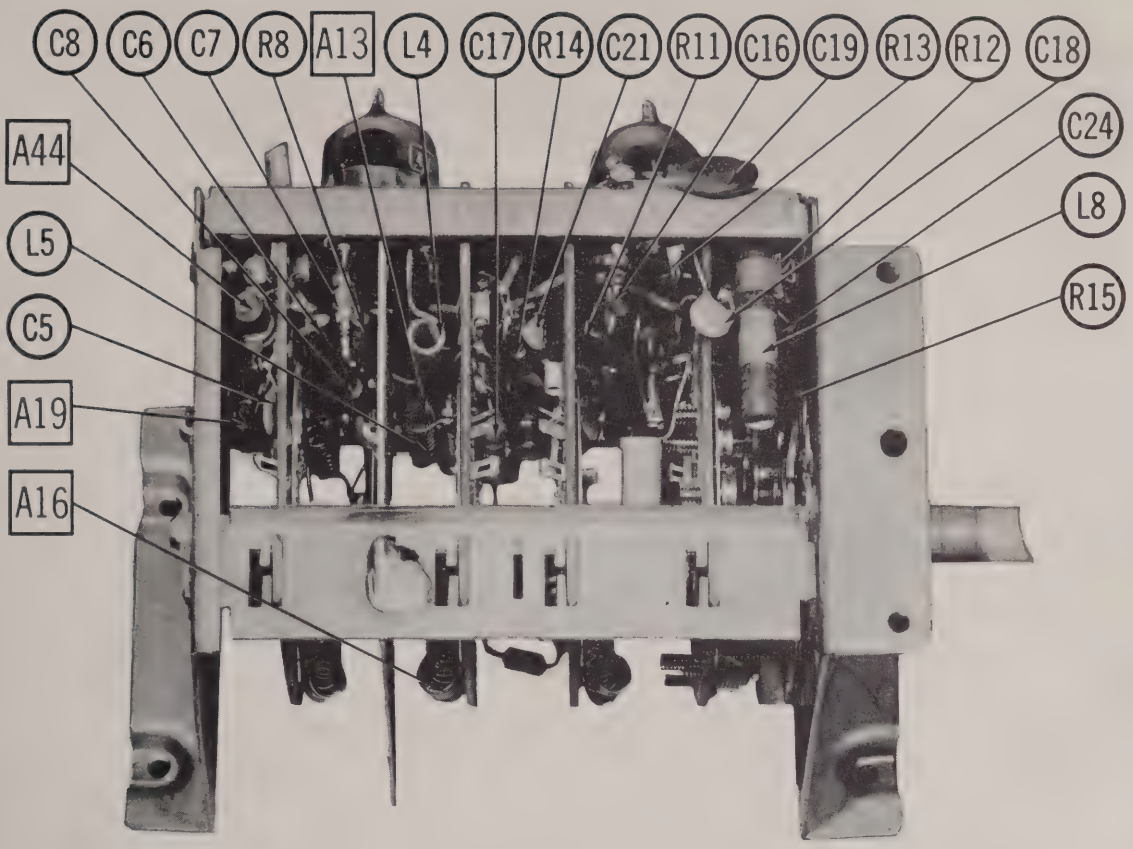
ALTERNATE TUNER SCHEMATIC



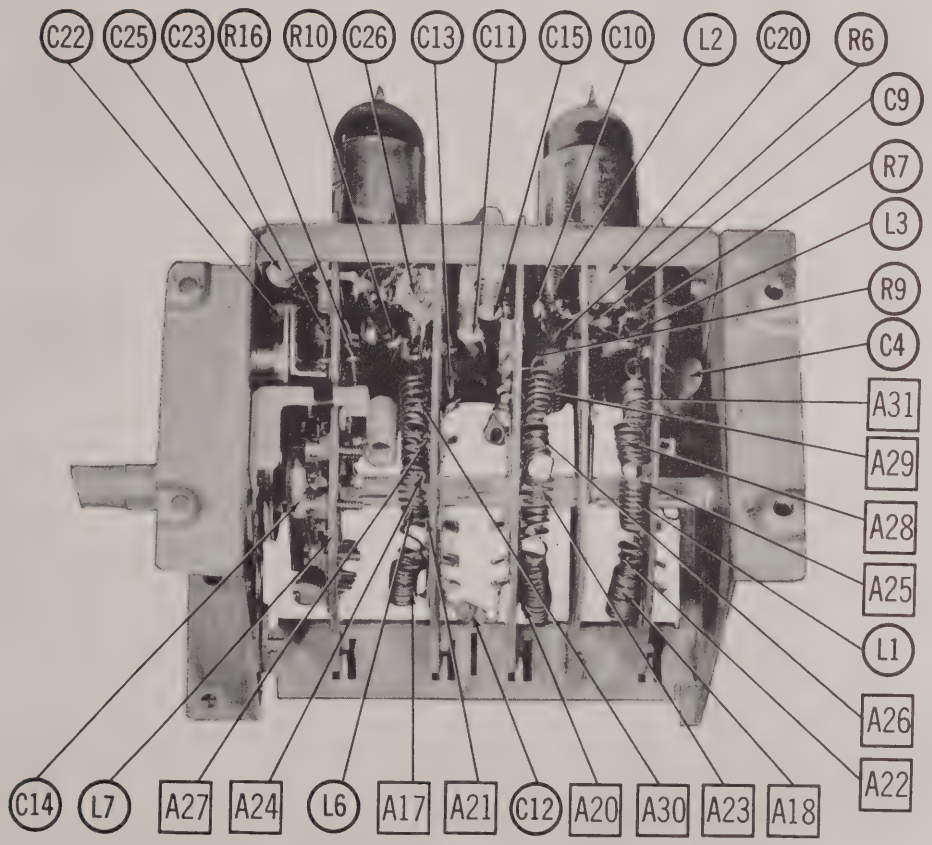
RF TUNER-TOP VIEW



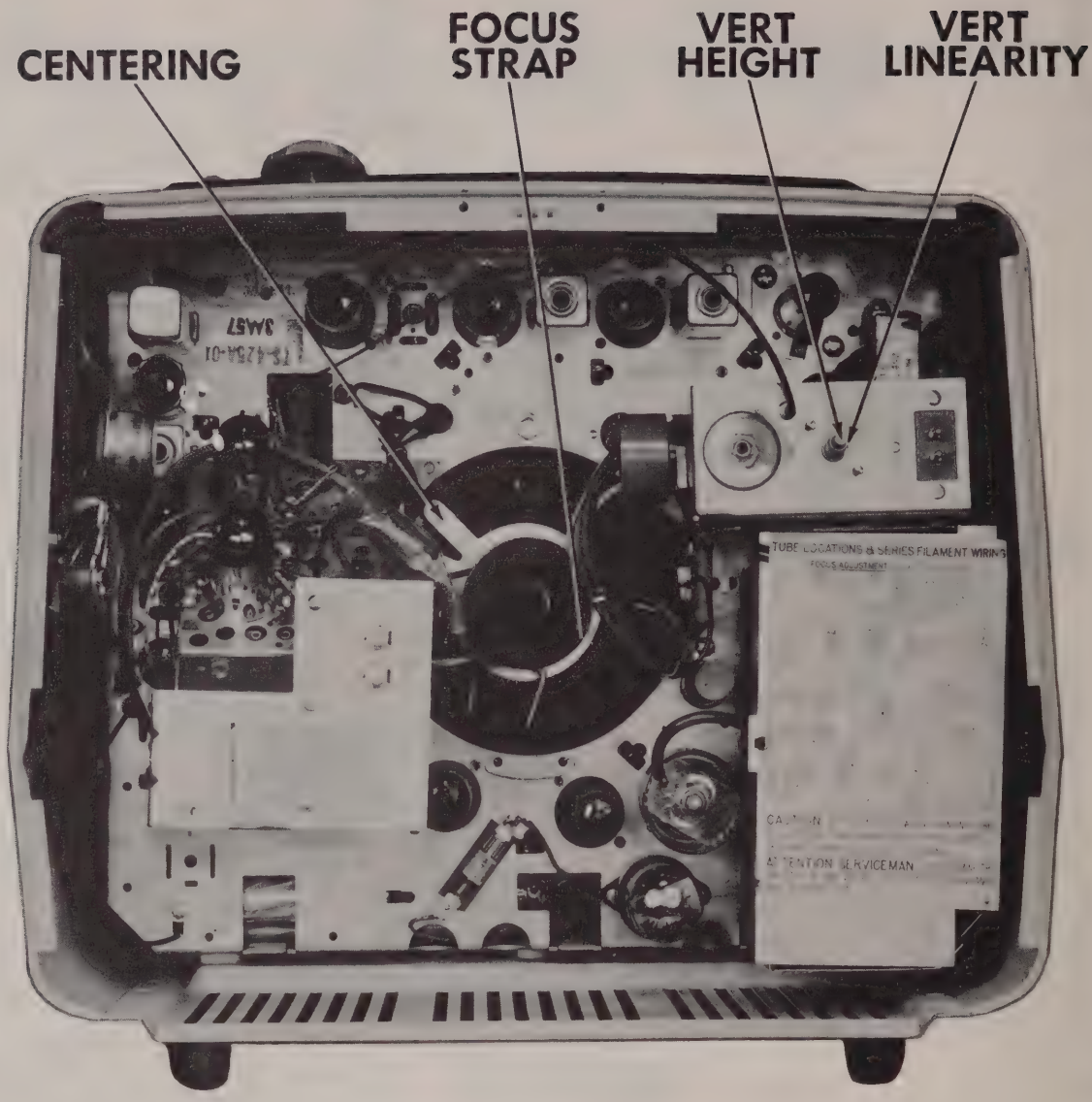
ALTERNATE TUNER SCHEMATIC



RF TUNER-LEFT SIDE



RF TUNER-RIGHT SIDE



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

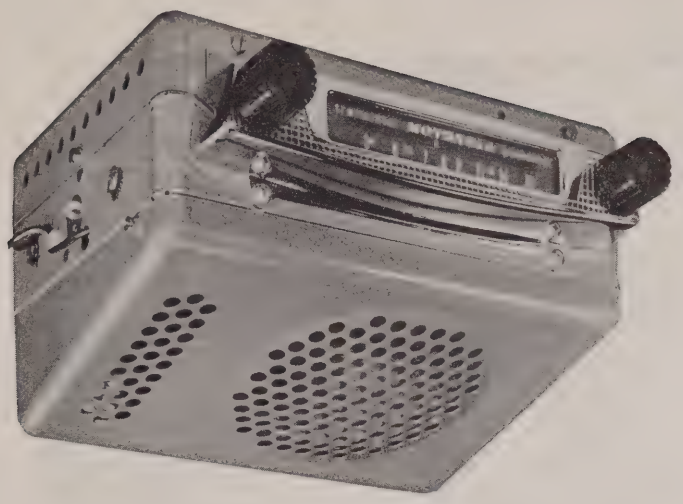
Turn the set on and tune in a TV station, preferably with a test pattern. Adjust the brightness and contrast controls for a normal picture.

1. Short out the AFC voltage by connecting a clip lead from pin 4 of the Service Test Receptacle (TP-8) to chassis. Connect a .1MFD, 400 volt capacitor from pin 2 of the Service Test Receptacle (TP-6) to chassis.

2. Adjust the horizontal hold control to the point where the picture remains stable horizontally.

3. Remove the capacitor from TP-6 and adjust the horizontal frequency slug (B1) to the point where the picture remains stable horizontally.

4. Remove the clip lead from TP-8 and chassis. Adjust the horizontal hold control until the picture remains in sync.



PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

MOTOROLA
MODEL 397X

TRADE NAME	Motorola Model 397X
MANUFACTURER	Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Ill.
TYPE SET	Battery Operated Universal Type AM Automobile Receiver With Transistorized Output
TUBES (Five)	Types 12DE8 Overload Limiter-RF Amp., 12AD6 Converter, 12AF6 IF Amplifier, 12F8 Det. -AVC-AF Amp., 12K5 Driver
POWER SUPPLY	12 Volt Storage Battery — RATING 1.8 Amp. @ 12.6 Volts DC
TUNING RANGE—BROADCAST	540KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1MFD	High side to pin 7 (grid) of 12AD6 (V2). Low side to chassis.	455KC (400~Mod.)	High frequency end stop	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2	Fig. 1	Thru dummy to Antenna receptacle	1610KC	"	"	A5, A6, A7	"

If tuner or tuner cores have been replaced or tampered with proceed with step 3. Alignment tool similar to Fig. 2 may be used. Back tuner cores out of coils before proceeding.

3	Fig. 1	Thru dummy to Antenna receptacle	1610KC	High frequency end stop	Across voice coil	A5, A6, A7	Adjust for maximum output.
4	"	"	1400KC	Adjust carriage 13/64" from high freq. end stop.	"	A8, A9, A10	Adjust for maximum output. Repeat steps 3 & 4.
5	With radio installed in car and antenna fully extended, tune in a weak station near 1400KC and adjust A7 for maximum volume.						

DIAL POINTER ADJUSTMENT

If necessary, set tuner to low frequency end of dial, adjust dial pointer so that the left edge of carriage lines up with calibration mark on top of dial backplate.

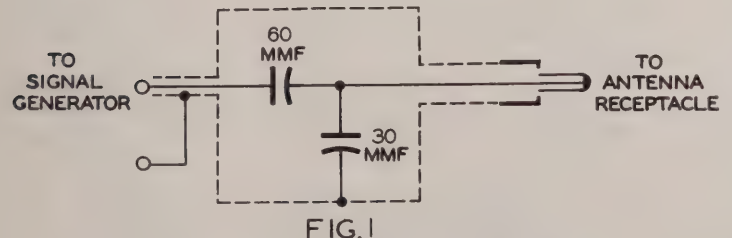


FIG. 1

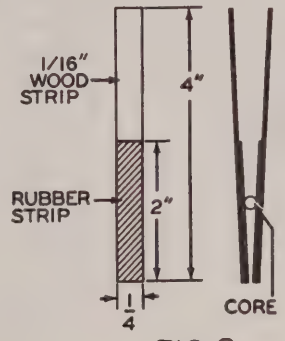


FIG. 2

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1957 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Overload Limiter-RF Amp.	12DE8	
V2	Converter	12AD6	
V3	IF Amplifier	12AF6	
V4	Det. -AVC-AF Amp.	12F8	
V5	Driver	12K5	

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA		NOTES
			CBS PART No.	SYLVANIA PART No.	
X1	2N178 ①	Output			① Some versions may use type 2N176 (Part #48C124246)

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲100	16	23B539261	AFH2-02-10	B0045	WP200.5	TMS-10	S-035	R2294 *
B	■500	16					TD-100-25	MTH-2550	

■ Non catalog item

FIXED CAPACITORS

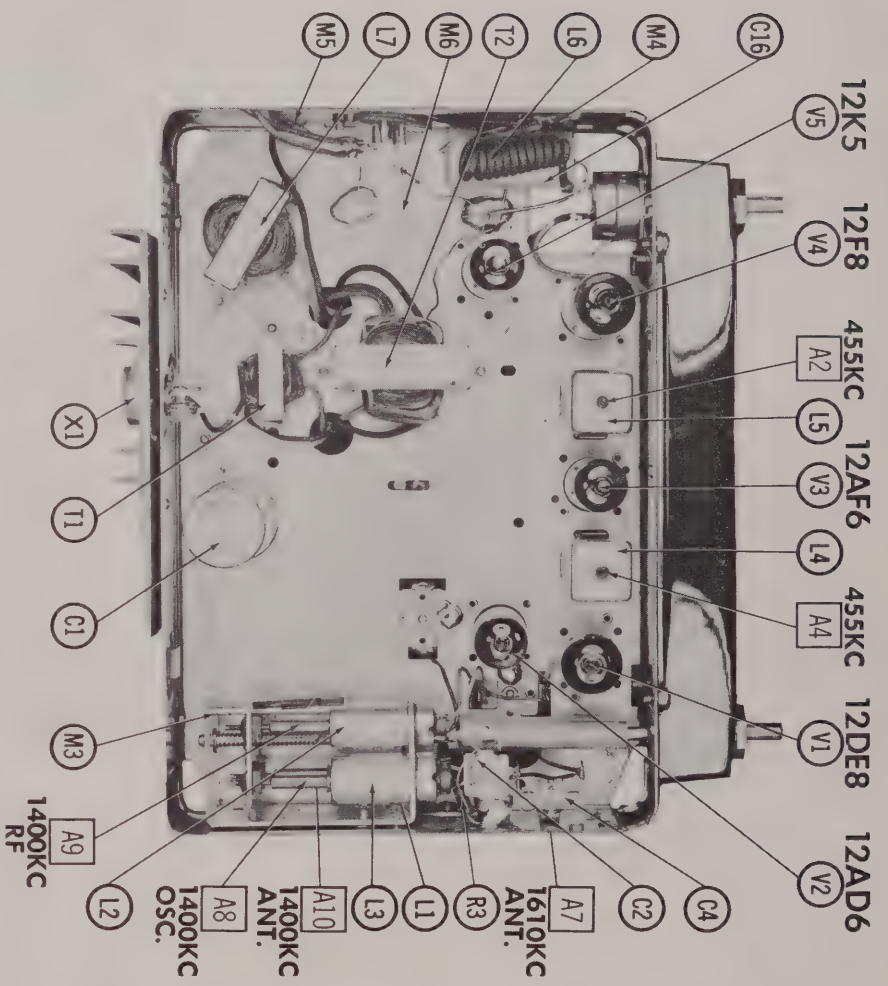
Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	90		21A591682							
C3	12		21R120549	SI 12	D6-120	LT6Q12	GP-12	UC-5412	5GA-Q12	
C4	50-240		20K538742							
C5	.05	200	8R121005	BPD-05	DF-503	CUB2S5		GEM-415	2TM-S5	
C6	20-180		20A481526							
C7	47		21R115593	N750-SI 47	TCN-47	C10Q47U	TC7-47	NT-5447	5TCU-Q47	N750
C8	395-470		20A485708							
C9	4.7		21R115954	NPO-SI 4.7	TCZ-4R7	CTA6V47C	TCO-4.7	ZT-5547	5TCCB-V47	
C10	.05	200	8R121005	BPD-05	DF-503	CUB2S5		GEM-415	2TM-S5	
C11	27		21R120567		TCN-27	CTA6Q27U	TC7-27			N750
C12	10000		21R482726	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C13	.05	200	8R121005	BPD-05	DF-503	CUB2S5		GEM-415	2TM-S5	
C14	.1	200	8R121573	P288N-1	DF-104	CUB2P1		GEM-201	2TM-P1	
C15	.01	200	8R121868	BPD-01	DD-103	CUB4S1	GP-10000	GEM-411	4TM-S1	
C16	.5	100	8K121666	P288N-5		CUB2P5		GEM-205	2TM-P5	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1Meg	½	18K540524	B-69	A47-1Meg-S	Q11-137	U54	Volume
B	Shaft			Not req.	RS-3	Not req.	Not req.	
C	Switch			KB-1	SWE-13	76-1	US-26	
R2	210Ω	1	18K540718		39-200			Bias Adjust (Wire Wound)

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R3	1.5Meg		6R3966	BTS-1.5Meg	
R4	1Meg		6R6046	BTS-1Meg	
R5	47K		6R6048	BTS-47K	
R6	470K		6R6032	BTS-470K	
R7	47K		6R6056	BTS-47K	
R8	150Ω		6R6373	BTS-150	
R9	12Meg		6R400334	BTS-12Meg	
R10	1Meg		6R6046	BTS-1Meg	
R11	6.8Meg		6R2097	BTS-6.8Meg	
R12	3.3Meg		6R2118	BTS-3.3Meg	
R13	36Meg		6K541294	BTS-36Meg	
R14	3.3Meg		6R2118	BTS-3.3Meg	
R15	220K		6R6407	BTS-220K	
R16	820K		6R6429	BTS-820K	
R17	10K		6R6320	BTS-10K	
R18	2.2Meg		6R6433	BTS-2.2Meg	
R19	82Ω		6R2035	BTS-82	
R20	56Ω		6R5614	BTS-56	
R21	18Ω		6R2031	BTS-18	
R22	5.6Ω	1	17K739323		
R23			6K540634		Note 1

Note 1. Special temp. comp. unit, 10Ω@ 25°C.

TRANSFORMER (DRIVER)

ITEM No.	Turns Ratio		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	6.5:	1	25B540658	GH6 ①			TR-21 ①	TZ-15 ②	① Tape center tap on primary winding. ② Fabricate mounting.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.1	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	28.8Ω	3-4Ω	25C540725						
	Turns Ratio								
	PRI.	SEC.2							
	1:	1							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	MOTOROLA PART No.	QUAM PART No.	
SP1	5 1/4"	PM	3-4Ω	50C534259	52A1	

COILS (RF-IF)

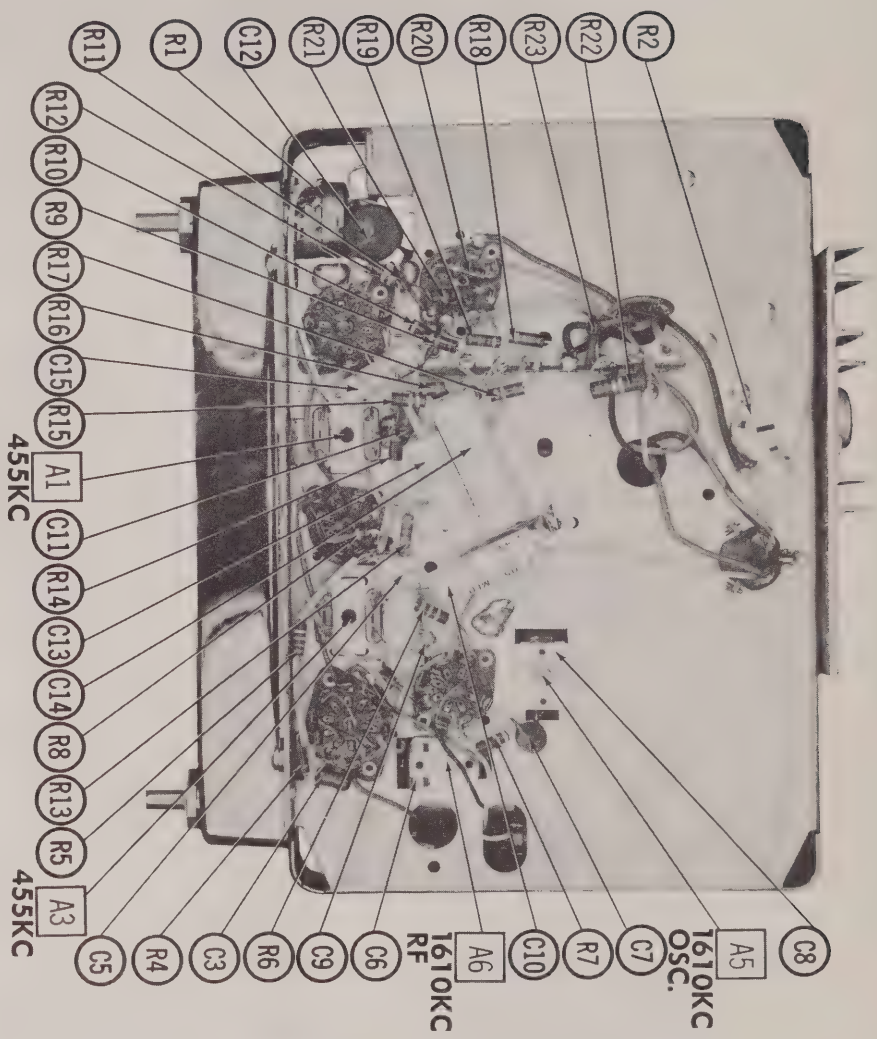
ITEM No.	USE	REPLACEMENT DATA				NOTES
		MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Antenna Coil	24B537770				Part of M3 Note 1
L2	RF Coil	24K536586				Part of M3 Note 1
L3	Osc. Coil	24K536595				Part of M3 Note 1
L4	Input IF	24K533461	16-6758	BC-352	12-C1	
L5	Output IF	24B533460	16-6770	BC-355	12-C6	
L6	Fil. Choke	24K580706				

Note 1. Antenna Coil Part #24B53760, RF Coil Part #24B502473 & Oscillator Coil Part #24B502474 used in Tuner Part #77D537758 (MT-185) & 77D537759 (MT-186).

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L7	.5A	.6Ω	8.8 Millihenries	25K540681					

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			MOTOROLA PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	SFE	9A	65R16248	9K540778	307009. (SFE 9A)	155009	SFE9	HRH

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M2	Dial Light	65R533821	#1891
M3	Tuner	77K537768	(MT-187)
	Tuner	77D537758	(MT-185)
	Tuner	77D537759	(MT-186)
M4	Spark Plate	64K535152	
M5	Spark Plate	64K535152	
M6	Spark Plate	64K535152	

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

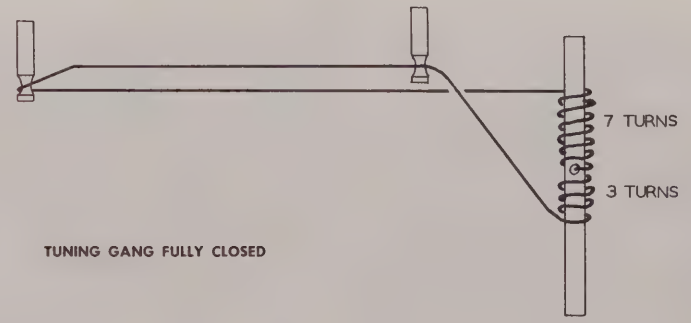
NAME	PART NO.	DESCRIPTION
Knob	36B536544	On-Off-Volume, Tuning
Cover	15K540546	Bottom
Cover	15K540547	Top
Dial	34B541094	
Pointer	1A501293	

EMITTER CURRENT ADJUSTMENT

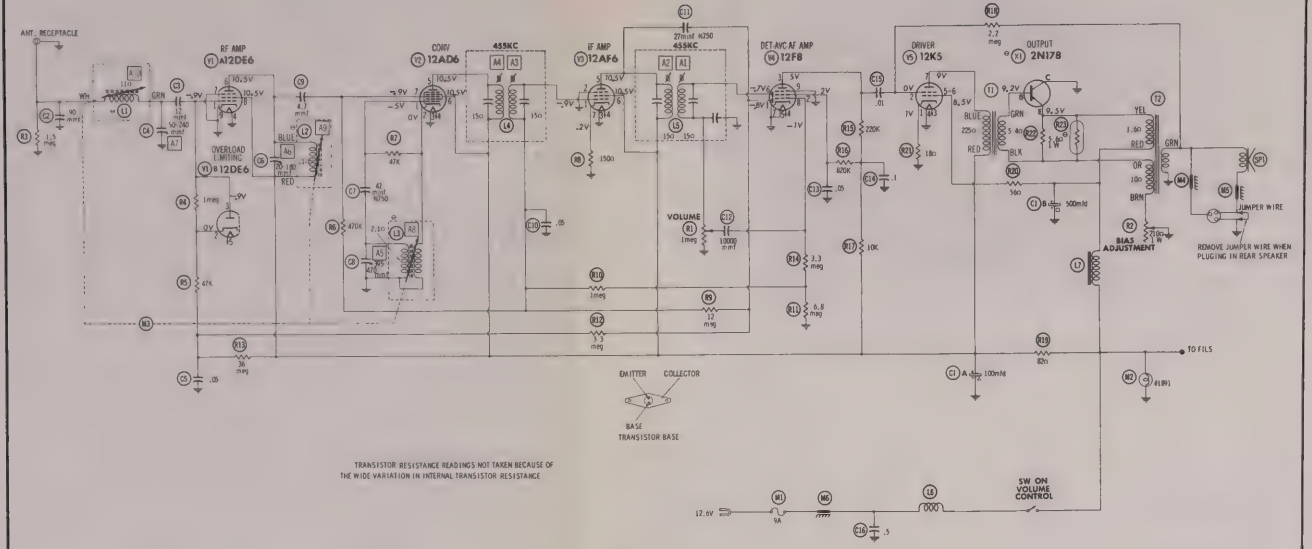
Connect a milliammeter in series with the emitter terminal of the transistor (X1). The internal resistance of the meter should not exceed .5Ω. Connect a power source of 14 Volts DC to the receiver and allow a warm-up period of 15 minutes. Adjust R2 for a meter reading of 500MA.

(Alternate Method)

Remove the transistor (X1) from its socket. Connect an ammeter (0-3 Amp.) in series with the receiver "A" lead. The internal resistance of the meter should not exceed .02Ω. Connect a power source of 14 volts DC to the receiver and allow a 15 minute warm-up period. Accurately measure the current, turn the receiver off and reconnect the transistor. Be certain that the mounting screws are tightened securely. Turn on the receiver and adjust R2 for an increase of 500MA in current drain.



DIAL CORD STRINGING



TRANSISTOR RESISTANCE READINGS NOT TAKEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12DE8	25Meg	24Meg	25Meg	0Ω	1.5Ω	†90Ω	0Ω	†82Ω	0Ω
V2	12AD6	47K	5Ω	0Ω	1.5Ω	†95Ω	†82Ω	8.2Meg		
V3	12AF6	7.8Meg	0Ω	0Ω	1.5Ω	†95Ω	†82Ω	150Ω		
V4	12F8	20Meg	†430K	†230K	1.5Ω	0Ω	1Meg	0Ω	10Meg	0Ω
V5	12K5	18Ω	2.2Meg	1.5Ω	0Ω	†56Ω	†56Ω	†315Ω		

† MEASURED FROM JUNCTION OF R19 AND L7

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

❶ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt
2. Socket connections shown as bottom views
3. Measured values are from socket pin to common negative
4. Battery voltage maintained at 12.6 volts for voltage readings
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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MODEL 321N62-A-612

TRADE NAME	Wells-Gardner	Models 321N62-A-612, 321N62U-A-612, 321N62-A-672, 321N62U-A-672, 2321N62-A-614, 2321N62U-A-614, 2321N62-A-674, 2321N62U-A-674
MANUFACTURER	Wells-Gardner Co., 2701 N. Kildare Avenue, Chicago 39, Illinois	
TYPE SET	Television Receiver	
TUBES	Sixteen	
POWER SUPPLY	110-120 Volts AC, 60 Cycle	RATING 155 Watts, 1.35 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)	

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Tube Placement Chart (Top View) 3

WELLS-GARDNER MODELS 321N62/U-A-612, 321N62/U-A-672, 2321N62/U-A-614, 2321N62/U-A-674

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DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 4 wood screws and the rear cover.
2. Remove 2 speaker leads.
3. Remove the antenna terminal board by loosening 2 wood screws.
4. Remove 2 metal screws holding the top of the chassis to the rear of the cabinet.
5. Remove 2 metal screws from inside the cabinet, holding the bottom of the chassis to 2 lower brackets.
6. Remove chassis by sliding out from the front of the cabinet.
7. Remove 4 speaker nuts and the speaker.

MODEL 321N62-A-612

CAUTION NOTE

ONE SIDE OF AC LINE CONNECTED TO CHASSIS
Care should be exercised when connecting test equipment or physically contacting the chassis.

MODELS

321N62-A-612, 321N62U-A-612, 321N62-A-672, 321N62U-A-672, 2321N62-A-614, 2321N62U-A-614, 2321N62-A-674, 2321N62U-A-674

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF oscillator is possible by removing the channel selector and fine tuning knobs. Set the fine tuning at the center of its range. The adjustments are accessible, one at a time, as the channel selector is rotated. Adjust for best picture and sound.

PICTURE TUBE SAFETY GLASS CLEANING

1. Remove the name plate by pulling straight out.
2. Remove 2 metal screws and the retainer bracket.
3. Remove the safety glass.

FOCUS

Adjust the ion trap for the best focus consistent with maximum brightness.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Set the horizontal hold control to the center of its range and adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate audio detector buzz, adjust the buzz control for MINIMUM buzz and maximum sound. (For location see tube placement chart).

FUSES

A thermal circuit breaker is used for LV power supply protection and may be closed by means of a reset button. (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

WELLS-GARDNER MODELS 321N62/U-A-612, 321N62/U-A-672, 2321N62/U-A-614, 2321N62/U-A-674

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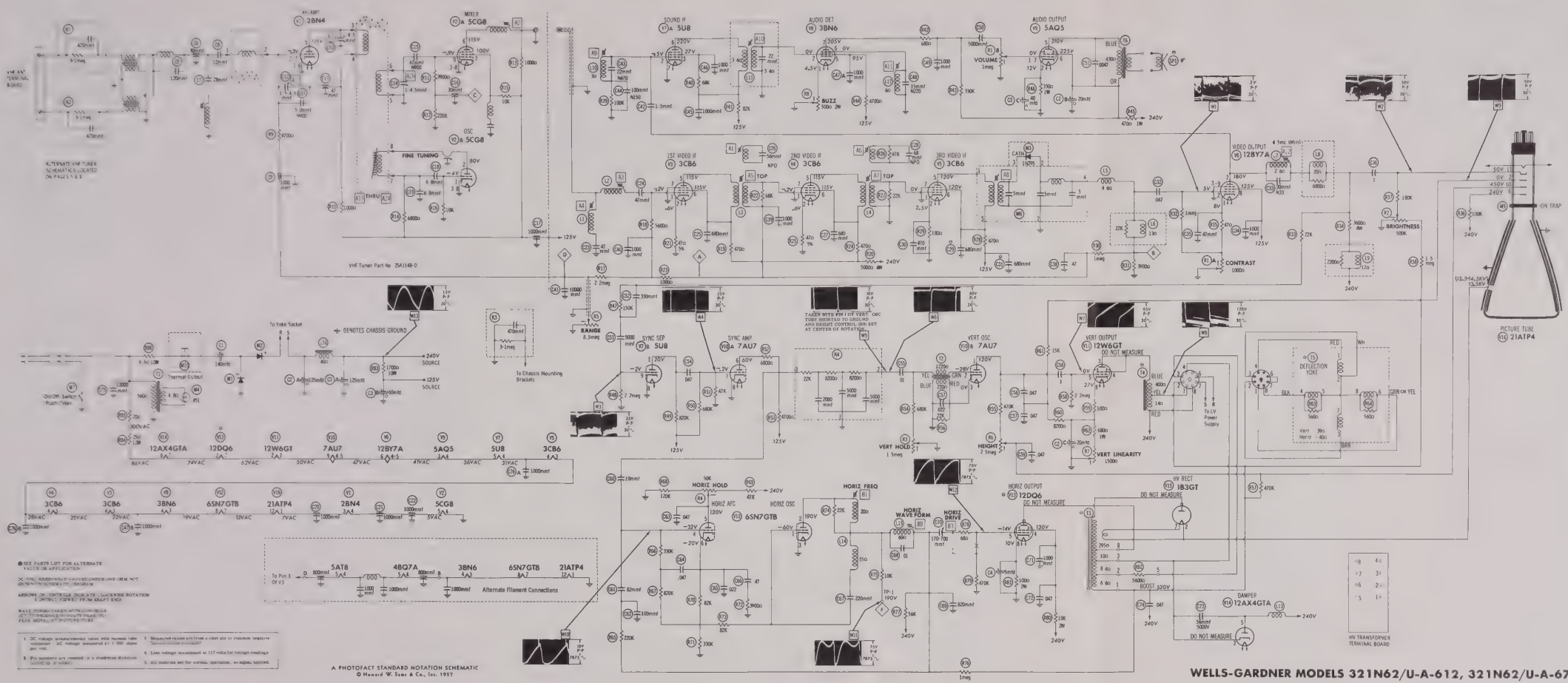
WELLS-GARDNER MODELS 321N62/U-A-612, 321N62/U-A-672,
2321N62/U-A-614, 2321N62/U-A-674
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VHF Tuner Part No 25A1148-D
ALTERNATE VHF TUNER SCHEMATICS LOCATED ON PAGES 5 & 6
DENOTES CHASSIS GROUND
To Yoke Socket
To Chassis Mounting Brackets
Thermal Cutout
Degaussing Switch Push-Type
PICTURE TUBE V16 21ATP4
ION TRAP
BRIGHTNESS 500K
CONTRAST 1000
VOLUME 1meg
BUZZ 5000
HEIGHT 2.5meg
VERT HOLD 1.5meg
VERT LINEARITY 15000
HORIZ HOLD 50K
HORIZ FREQ
HORIZ WAVE FORM
HORIZ DRIVE
BOOST 520V
DO NOT MEASURE
To LV Power Supply
To Pin 3 Of V3
Alternate Filament Connections
12AX4GTA 12DQ6 12W6GT 7AU7 12BY7A 5AQ5 5U8 3CB6
3CB6 3CB6 3BN6 6SN7GTB 21ATP4 2BN4 5CG8
5AT8 4BQ7A 3BN6 6SN7GTB 21ATP4
1. DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured at 1 000 ohms per volt.
2. Pin numbers are counted in a clockwise direction looking at socket.
3. Measured values are from socket pin to common negative (chassis) point unless otherwise indicated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation, no signal applied.

TUBE PLACEMENT CHART

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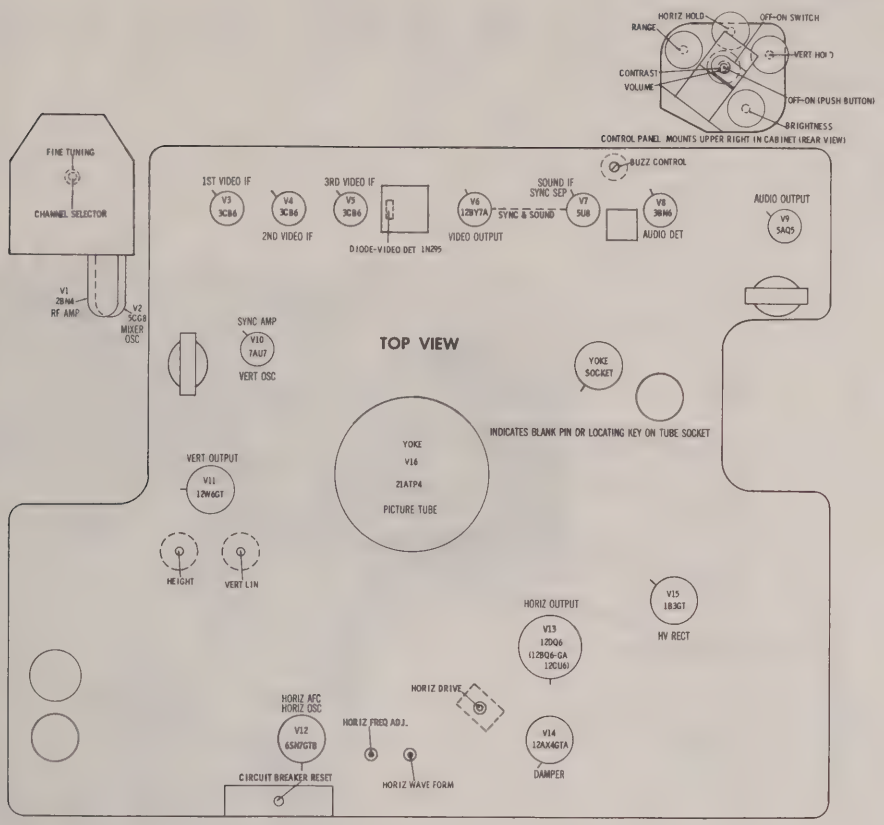


TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

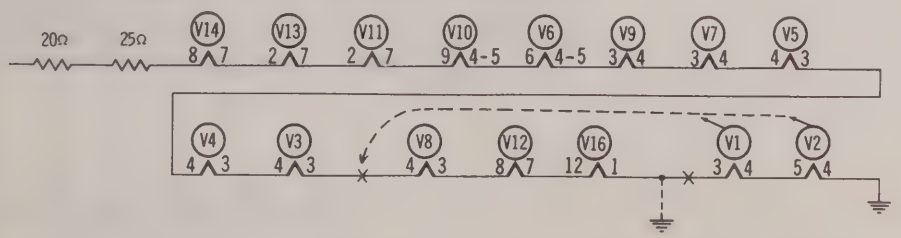
POWER SUPPLY FAILURE
No raster, no sound - **Circuit Breaker (M10), Rectifier (M1, M2)**

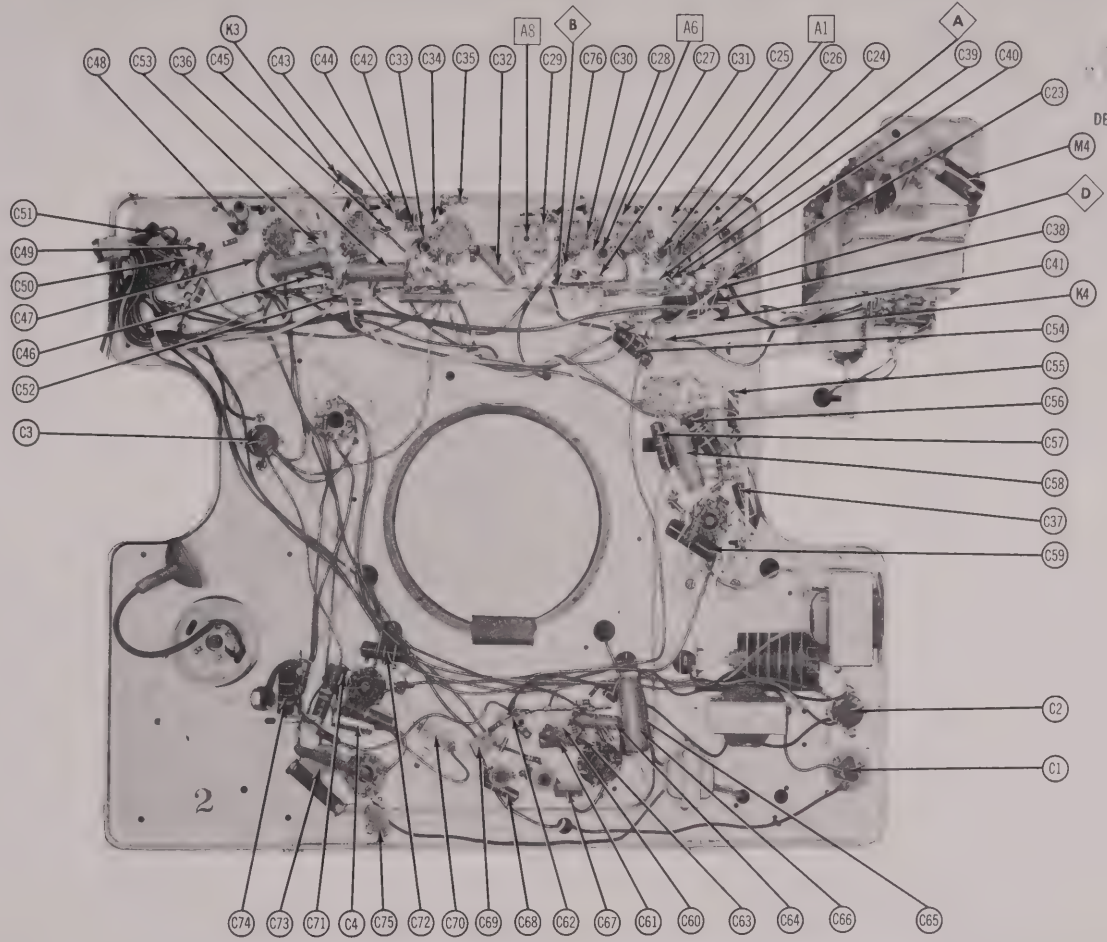
LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V3, V4, V5, Diode (M3), V6**
No pic, no sound, has snow - **V1, V2**
No pic, has sound, has raster - **V6, V16**
Has pic, no sound - **V7, V8, V9**

SYNC FAILURE
No vert. sync - **V7, V10**
No horiz. sync - **V7, V10, V12**
No vert. or horiz. sync - **V7, V10**

SWEEP FAILURE
No raster, has sound - **V12, V13, V14, V15, V16**
No vertical deflection - **V10, V11**
Poor vert. linearity or foldover - **V10, V11**
Poor horiz. linearity or foldover - **V12, V13, V14**
Narrow picture - **V12, V13, V14, M1, M2**
Vert. off freq. - **V10**
Horiz. off freq. - **V12**

This receiver employs tubes used in a series filament network, an open filament in any tube in the series will cause the set to be inoperative.(See circuit below).





CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

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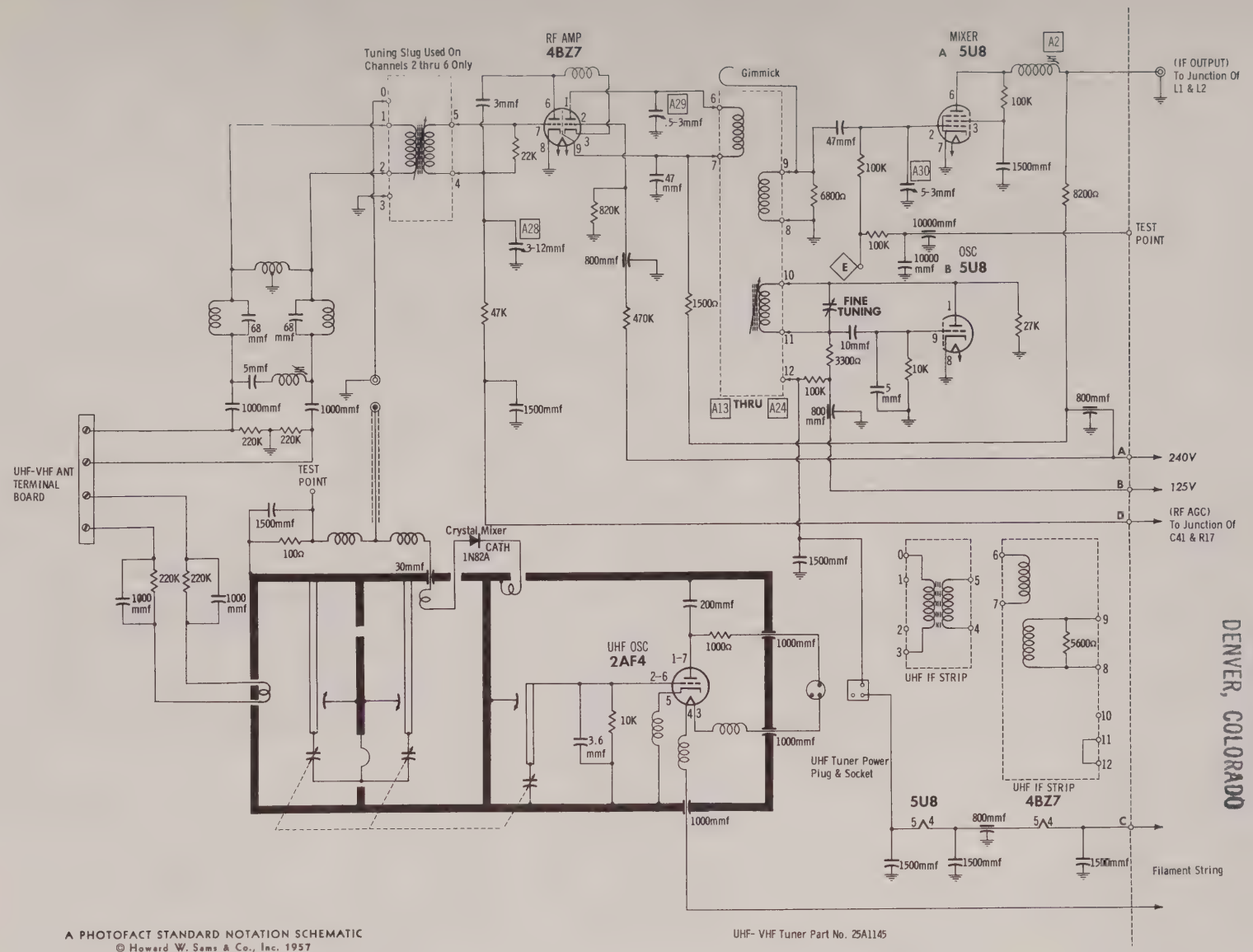

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UHF- VHF Tuner Part No. 25A1145

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ALTERNATE TUNER SCHEMATIC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.

VIDEO IF ALIGNMENT

Connect the negative lead of a 1.5 volts bias supply to point (A). For steps 3 thru 7 increase bias at point (A) to 4.5 volts.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to ungrounded tube shield floating over mixer-oscillator tube (V2). Low side to chassis	44.5MC (10MC Swp)	47.25MC	Any non-interfering channel	Vert. Amp. thru detector (Fig. 1) to pin 5 (plate) of 3CB6 (V3). Low side to chassis.	A1	Adjust to place marker in trap notch as in Fig. 2.
2.	"	"	"	41.25MC 45.75MC	"	"	A2, A3, A4	Adjust for response curve similar to Fig. 2 with markers as indicated. A2 and A3 controls shape of curve top and positions 45.75MC marker. A3 positions 41.25MC marker. Both markers must be correctly positioned before proceeding with alignment.
3.	"	"	"	42.8MC	"	Vert. Amp. thru 47K to point (B). Low side to chassis.	A5	Adjust sweep output for 2 volts at point (B). Adjust for maximum amplitude at marker.
4.	"	"	"	41.25MC	"	"	A6	Adjust for MINIMUM amplitude at marker.
5.	"	"	"	45.3MC	"	"	A7	Adjust for maximum amplitude at marker.
6.	"	"	"	44.0MC	"	"	A8	"
7.	"	"	"	41.25MC 42.4MC 42.8MC 44.0MC 44.5MC 45.3MC 45.75MC 47.25MC	"	"		Check for response curve similar to Fig. 3 with markers as indicated. If necessary SLIGHTLY retouch A1, and A4 thru A8 for desired reponse. DO NOT retouch A2 or A3.

SOUND IF ALIGNMENT

Turn the set on and tune in a TV station. Reduce the signal strength at the antenna terminals by using an attenuator or similar device until a "Hiss" is heard in the sound.
Adjust A9, A10, All and buzz control (R8) for maximum undistorted sound and MINIMUM buzz.
If the hiss disappears during alignment, reduce signal strength still further.

4.5MC TRAP ALIGNMENT

Use 0-10 volt scale on VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8.	.001MFD	High side to pin 2 (grid) of 12BY7A (V6). Low side to chassis.	4.5MC (Unmod)	Any non-interfering	DC probe to pin 11 (cathode) of picture tube. Common to chassis.	A12	Adjust for MINIMUM deflection.

VHF OSCILLATOR ALIGNMENT

Connect the negative lead of 3 volt bias supply to point (D). Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the center of its range.
Use only enough sweep generator output to provide usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 47K to point (B). Low side to chassis.	A13	Adjust to place sound marker in trap notch as in Fig. 4. Video marker should fall at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A14	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A15	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A16	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A17	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A18	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A19	
			85MC (10MC Swp)	83.25MC 87.75MC	8		A20	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A21	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A22	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A23	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A24	

ALIGNMENT INSTRUCTIONS (cont)

VHF RF AND MIXER ALIGNMENT FOR TUNER #25A1148-D

Connect bias as under "VHF Oscillator Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC (10MC Swp)	193.25MC 197.75MC	10	Vert. Amp. thru 10K to point (C). Low side to chassis.	A25, A26	Adjust A25 and A26 for response similar to Fig. 5 with markers on shoulders of curve.
11.	"	"	195MC (10MC Swp)	193.25MC 197.75MC	"	"	A27	Adjust for MINIMUM amplitude.
12.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response similar to Fig. 5. If markers fall below 70% on any channel, make compromise adjustment of A25 and A26 with channel switch set to that channel. Check all other channels to see that they have not been seriously affected.
			207MC (10MC Swp)	205.25MC 209.75MC	12			
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

VHF RF AND MIXER ALIGNMENT FOR TUNERS #25A1145 AND 25A1143

Connect bias as under "VHF Oscillator Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 10K to point (E). Low side to chassis.	A28, A29, A30	Adjust for response curve similar to Fig. 5, with markers above 90%.
14.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response similar to Fig. 5. If markers fall below 70% on any channel, make compromise adjustments of A28, A29, and A30 with channel switch set to that channel. Check all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

UHF TUNER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

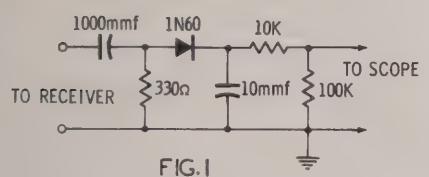


FIG. 1

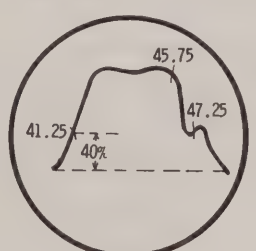


FIG. 2

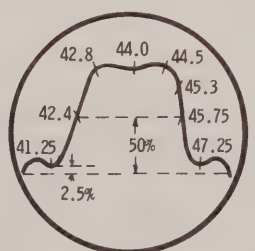


FIG. 3

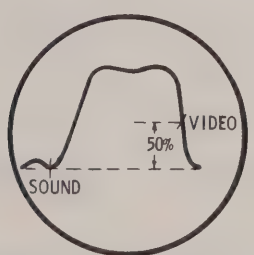


FIG. 4

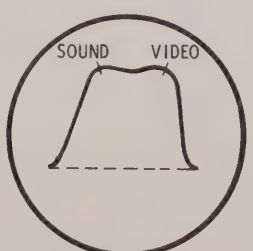
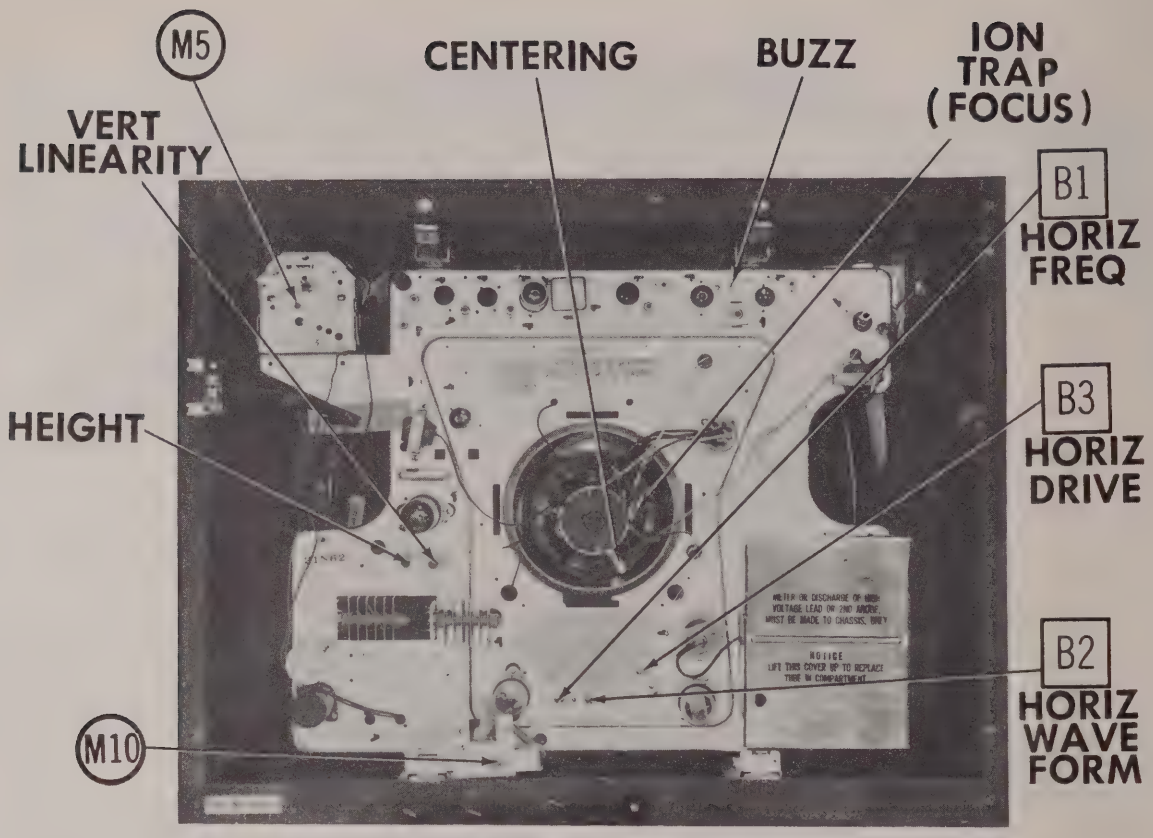


FIG. 5



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.
Turn the horizontal hold control to the center of its range.
Connect a short clip lead across the horizontal waveform coil (L15).
Adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.
Remove the clip lead from L15. Connect the vertical amplifier of the scope thru a low capacity probe to point (F). Low side to chassis.

Adjust the horizontal waveform slug (B2) for equal peaks of round and sharp peaks of waveform as in Fig. 6. While making this adjustment, keep the picture in sync with the horizontal hold control and B1.
Adjust the horizontal drive trimmer (B3) clockwise as far as possible without the presence of vertical white lines or compression near the center of the picture.

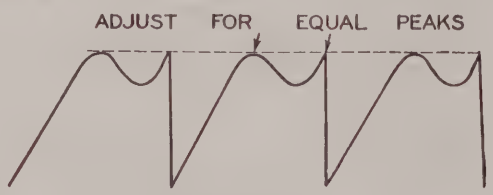
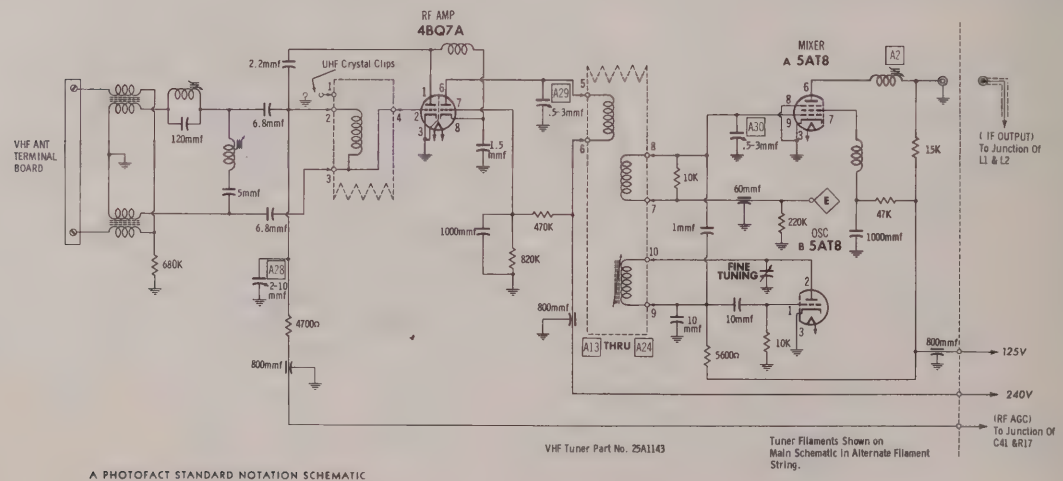


FIG. 6



A PHOTOFACT STANDARD NOTATION SCHEMATIC
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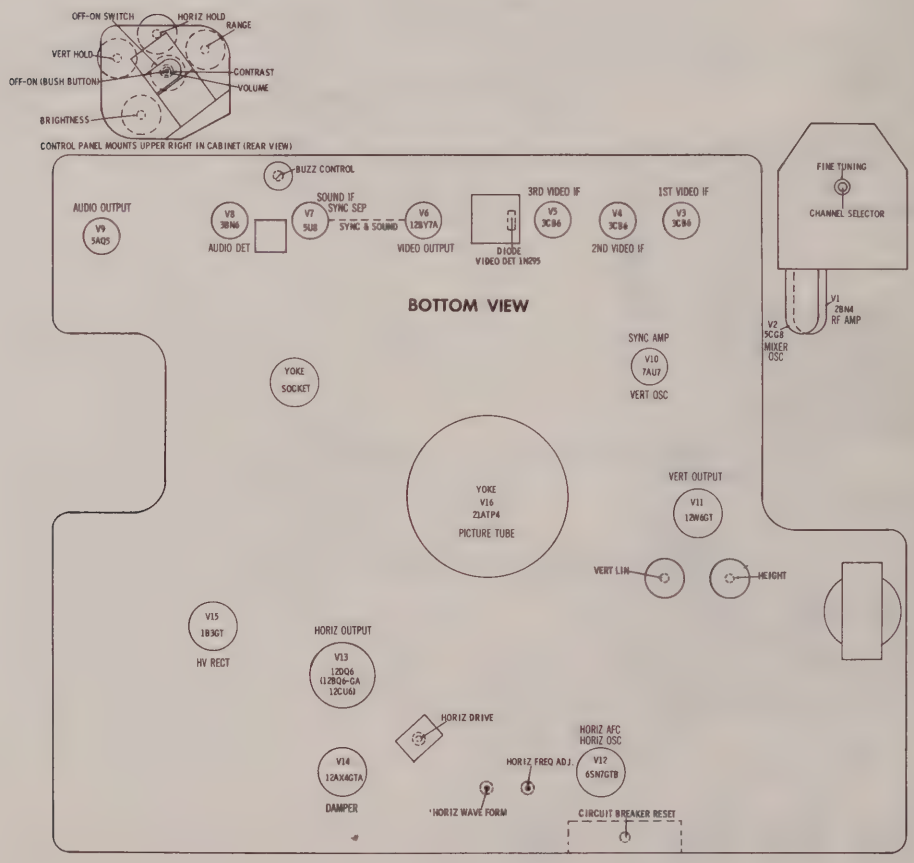
ALTERNATE TUNER SCHEMATIC

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	2BN4	0Ω	2Meg	1.5Ω	1Ω	† 2700Ω	0Ω	1Meg		
V2	5CG8	10K	† 8500Ω	0Ω	0Ω	1Ω	† 2700Ω	† 12K	0Ω	220K
V3	3CB6	1Meg	47Ω	5Ω	6Ω	† 5500Ω	† 5500Ω	0Ω		
V4	3CB6	1Meg	47Ω	6Ω	7Ω	† 5500Ω	† 5500Ω	0Ω		
V5	3CB6	.1Ω	180Ω	7Ω	8.5Ω	† 2200Ω	† 2200Ω	0Ω		
V6	12BY7A	• 300Ω	1Meg	0Ω	13Ω	13Ω	14Ω	† 3700Ω	† 1700Ω	0Ω
V7	5U8	† 820K	100K	† 150K	8.5Ω	10Ω	† 82K	0Ω	0Ω	2.2Meg
V8	3BN6	• 450Ω	3.4Ω	4.5Ω	5Ω	† 6500Ω	6Ω	† 330K		
V9	5AQ5	55Ω	330Ω	13Ω	10Ω	† 950Ω	† 500Ω	55Ω		
V10	7AU7	ǂ • 2.3Meg	• 1.1Meg	22K	14Ω	14Ω	† 13K	38K	0Ω	15Ω
V11	12W6GT	TP	17Ω	† 400Ω	† 400Ω	2.2Meg	TP	15Ω	• 1000Ω	
V12	6SN7GTB	400K	† 56K	0Ω	1.5Meg	• † 55K	400K	3Ω	4.5Ω	
V13	12DQ6	NC	20Ω	TP	† 10K	470K	TP	17Ω	100Ω	TOP CAP ǂ 10Ω
V14	12AX4GTA	TP	NC	¶	NC	† 40Ω	NC	20Ω	22Ω	
V15	1B3GT	PINS	1 THRU 8	HAVE	INFINITE	RESISTANCE				TOP CAP ǂ 305Ω
V16	21ATP4	1.5Ω	23K	PIN 6 † 100K	PIN 10 ǂ 470K	PIN 11 170K	PIN 12 3Ω			

† MEASURED FROM OUTPUT OF M 2.
ǂ MEASURED FROM PIN 3 OF V14.
• THIS READING WILL VARY, CONTROL SET FOR NORMAL OPERATION.
¶ THIS READING CAN VARY GREATLY, (10K MINIMUM), DUE TO THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
TP TIE POINT
NC NO CONNECTION



TUBE PLACEMENT CHART

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CHASSIS TOP VIEW

HORIZ WAVE FORM 190V

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	RF Amplifier	3BN4	
V2	Mixer-Oscillator	3CQ8	
V3	1st Video IF Amp	3CB6	
V4	2nd Video IF Amp	3CB6	
V5	3rd Video IF Amp	3CB6	
V6	Video Output	12BY7A	
V7	Sound IF - Sync Sep	3U8	
V8	Audio Det.	3BN6	

ITEM No	USE	TYPE	NOTES
V9	Audio Output	5AQ5	
V10	Sync Amp - Vert Osc	7AU7	
V11	Vert Output	12W6GT	
V12	Horiz AFC-Horiz Osc	6SN7GTB	
V13	Horiz Output	12DQ6	Note 1
V14	Damper	12AX4GTA	
V15	HV Rectifier	1B3GT	

Note 1. Bone versions may use a 12CU5 or 12BQ6GA in this application

PICTURE TUBE

ITEM No	REPLACEMENT DATA			NOTES
	Wells-Gardner Part No	GENERAL ELECTRIC Part No	SYLVANIA Part No	
V16	21AUP4	21AUP4 21AUP4A ①	21AUP4 21AUP4A ②	1/ Aluminized 2/ Silver screen '85'

ELECTROLYTIC CAPACITORS

ITEM No	RATING CAP	VOLT	Wells-Gardner Part No.	AEROVOX Part No.	CORNELL-DUBILIER Part No.	MALLORY Part No.	PYRAMID Part No.	SANGAMO Part No.	SPRAGUE Part No.	NOTES
C1	140	150	453431	APH1-33	XA0281 DD0946	FP117 FP215 FT2515	TMS-36 TMT-36	MT-15150	TVL-1438 TVL-1439	R3378 *
C2A	125	300	453431	APH4-2390						
B	40	300								
C	20	50								
C3A	125	300	453430	APH3-99-52	DD040 BR505	FP275.4 UTC80			TVL-3574.6	
B	60	300								
C4	60	50								
C5	30	50	453418	PHR50V3	BBR5-50	TC30	TD-8-50	MT-0804	TVA-1303	

* Non-catalog item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	VOLT	Wells-Gardner Part No.	AEROVOX Part No.	CENTRALAB Part No.	CORNELL-DUBILIER Part No.	ERIE Part No.	MALLORY Part No.	SPRAGUE Part No.	NOTES
C5	120			BPD-00013	DD-121	L10T13	ED-130	UC-5313	SGA-T13	
C6	30									
C7	33									
C8	15									
C9	1000			EF-001	MPT-1000				SGC-D1	
C10	4-6.5				6S-8		532-B			
C11	9.0									N900
C12	1.5- 4.5			832-5			532-B			
C13	47									
C14	1-4.5			832-5			532-B			
C15	47									
C16	30									
C17	1000			EF-001	MPT-1000				SGC-D1	
C18	6.8									
C19	6.8									
C20	1000			EF-001	MPT-1000				SGC-D1	
C21	1000			EF-001	MPT-1000				SGC-D1	
C22	1000			EF-001	MPT-1000				SGC-D1	
C23	47		472X025	EH 47	DE-470	LT4Q47	ED-47	UC-5447	SGA-Q47	
C24	47		472X025	EH 47	DE-470	LT4Q47	ED-47	UC-5447	SGA-Q47	
C25	560		502X5	BPD-00068	DD-561	L10T68	ED-680	UC-5368	SGA-T68	
C26	56			MPG-S1 56	TCZ-56	C10Q68C	TCO-56			NP0
C27	680		502X5	BPD-00068	DD-681	L10T68	ED-680	UC-5368	SGA-T68	NP0
C28	68			MPG-S1 68	TCZ-68	C10Q68C	TCO-68			NP0
C29	680		503X15	BPD-00068	DD-681	L10T68	ED-680	UC-5368	SGA-T68	Note 1
C30	470		502X4	BPD-00047	DD-471	BYA047	ED-470	UC-5347	SGA-T47	
C31	680		503X1	BPD-00068	DD-681	L10T68	ED-680	UC-5368	SGA-T68	Note 3
C32	.047	200	RCP10M4275 M	BPD-05	DF-503	CUB2347		GEM-2147	STM-347	N33
C33	30		472X699							
C34	1000		503X1	BPD-001	DD-103	BYA5D1	ED-1000	DC521	SHK-D1	
C35	47		472X025	EH 47	DE-470	LT4Q47	ED-47	UC-5447	SGA-Q47	
C36	1	400	RCP10M4104M	P48N-1	DF-104	CUB47P1		GEM-401	4TM-P1	
C37	.047	200	RCP10M4473M	BPD-05	DF-503	CUB2347		GEM-2147	STM-347	
C38	.47	200	RCP10M4474M	P288N-47		CUB2347		GEM-2047	STM-247	
C39	1000		503X1	BPD-001	DD-102	BYA5D1	ED-1000	DC521	SHK-D1	
C40	1000		503X1	BPD-001	DD-102	BYA5D1	ED-1000	DC521	SHK-D1	
C41	10000		473X196	BPD-01	DD-103	BYA561	ED-01	DC511	SHK-E1	
C42	1.5		472X394	NPO-S1 1.5	TCZ-1R5		TCO-1.5	ET-5515	STCCB-V15	
C43	33		472X071							N470
C44	1000		503X1							N150
C45	1000		503X1	BPD-001	DD-102	BYA5D1	ED-1000	DC521	SHK-D1	
C46	1000		503X1	BPD-001	DD-102	BYA5D1	ED-1000	DC521	SHK-D1	
C47	1000		503X3	BPD-00001	DD3-102	BYC5D1	ED5-001	DC5D51	SHK-D1	
C47A	1000									
B	1000									
C48	15		472X072							N330
C49	1000		503X1	BPD-001	DD-102	BYA5D1	ED-1000	DC521	SHK-D1	
C50	5000		473X507	BPD-006	DD-502	BYA5D5	ED-005	DC535	SHK-D5	
C51	.0047	600	RCP10M4472M	BPD-0047	DE-472	CUB5D47	ED-0047	GEM-5247	STM-D47	
C52	.01	400	473X370	1464-00053		1R5723			M6-332	
C53	5000		473X507	BPD-006	DD-502	BYA5D5	ED-005	DC535	SHK-D5	
C54	.047	400	RCP10M4473M	BPD-05	DF-503	CUB4347		GEM-4147	4TM-347	
C55	.01	600	RCP10M4103M	BPD-01	DF-103	CUB4P47		GP-10000	4TM-P47	
C56	.047	400	RCP10M4473M	BPD-05	DF-503	CUB4347		GEM-4147	4TM-347	
C57	.022	200	RCP10M2232M	BPD-03	DF-223	CUB2322		GEM-2122	STM-322	
C58	.1	400	RCP10M4104M	P48N-1	DF-104	CUB4P1		GEM-401	4TM-P1	
C59	.047	800	RCP10M4473M	BPD-05	DF-503	CUB5347		GEM-5147	5TM-D47	
C60	10		RCM20B100K	1464-00001		1R5G18			M6-416	
C61	82		RCM20B820K	1464-00018		1R5G82			M6-482	
C62	100		RCM20B101K	1464-00061		1R572			MC135	
C63	.047	400	RCP10M4473M	BPD-05	DF-503	CUB4347		GEM-4147	4TM-347	
C64	.047	200	RCP10M4473M	BPD-05	DF-503	CUB2347		GEM-2147	STM-347	
C65	.022	200	RCP10M2232M	BPD-03	DF-223	CUB2322	ED-02	GEM-2122	STM-322	
C66	.47	200	RCP10M2474M	P288N-47		CUB2347		GEM-2047	STM-247	
C67	330		RCM20B331K	1464-00033		1R5723			M6-332	
C68	.01	400	RCP10M4103M	BPD-01	DF-103	CUB4S1	ED-01	GEM-411	4TM-S1	
C69	820		RCM20B821K	1464-00083		1R5723			M6-382	
C70	170- 700		17A271							
C71	1000		503X1	BPD-001	DD-102	BYA5D1	ED-1000	DC521	SHK-D1	
C72	.047	400	RCP10M4473M	BPD-05	DF-503	CUB4347		GEM-4147	4TM-347	
C73	56	5000	472X758		DD60-560					
C74	.047	400	RCP10M4473M	BPD-05	DF-503	CUB4347		GEM-4147	4TM-347	
C75	10000		473X815	BPD-01	DD-103	BYA561	ED-01	DC511	SHK-E1	

CAPACITORS (cont)

ITEM No	RATING CAP	VOLT	Wells-Gardner Part No	AEROVOX Part No	CENTRALAB Part No	CORNELL-DUBILIER Part No	ERIE Part No.	MALLORY Part No.	SPRAGUE Part No	NOTES
C76A	1000		503X3	BPD-2X001	DD5-102	BYC5D1	ED5-001	DC5D51	5HK-D1	
B	1000									

Note 1. Bone versions use a 560MMF in this application.
Note 2 Some versions use a 1000MMF in this application.

CONTROLS

ITEM No	RATING RESISTANCE	WATTS	Wells-Gardner Part No	CENTRALAB Part No	CLAROSTAT Part No	IRC Part No	MALLORY Part No	INSTALLATION NOTES
R1A	1000Ω	1	76X35					Contrast Volume
B	1Meg	1		4X-148	A47-500K-S	GU-153	U150	Brightness
R2A	500K	1	40X416	AB-59	RS-3/16	NQ	D8-37	
B	Shaft			AK-8	A47-1.5Meg-S	GU-138	U155	Vert Hold
R3A	1.5Meg	1	40X415	AB-59	AS-742	NQ	D8-37	
B	Shaft			AK-8	RS-3/16	GU-133	U158	Horiz. Hold
R4A	50K	1	40X414	AB-51	A47-500K-S	NQ	D8-37	
B	Shaft			AK-8	RS-3/16			
R5	5 MEG	1	40X47					Height
R6A	2.5Meg	1	40X248	BK-83	A47-2.5Meg-S	GU-339	TA356L	
B	Shaft			Not Req.	FKS-1/3	TQ	Not Req.	Vert. Lin.
R7A	1800Ω	1	40X399	B-8	A47-1800-S	GU-108	PTA183L	
B	Shaft			Not Req.	FKS-1/3	TQ	Not Req.	Buzz
R8	500Ω	2	40X397		3S-500		FL-500	

* The resistance of this control will vary from T to 10 megs.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No	RATING OHMS	WATT	Wells-Gardner Part No	IRC Part No	NOTES
R9	47000			BTS-4700	
R10	10000			BTS-1000	
R11	39000			BTS-3900	
R12	330K			BTS-330K	
R13	10000			BTS-1000	
R14	68000			BTS-6800	
R15	10K			BTS-10K	
R16	10K			BTS-10K	
R17	2.2Meg		B54335		
R18	5600Ω		B54565		
R19	4700		B54571	BTS-470	
R20	50000	4	43X333	PW4-5000	
R21	470 5%		B53470	BTS-47 5%	
R22	68K		B54683		
R23	10000		B55101		
R24	4700		B55471	BTS-470	
R25	470 5%		B53470	BTS-47 5%	
R26	47K		B54473		
R27	22K		B54223	BTS-22K	
R28	470		B54571	BTS-470	
R29	180Ω		B54181	BTS-180	
R30	1Meg		B54105	BTS-1Meg	
R31	39000		B54393	BTS-3900	
R32	1Meg		B54105	BTS-1Meg	
R33	33K		B54323	BTS-33K	
R34	56000	4	43X351		
R35	47		B54470	BTS-47	
R36	100K		B55104	BTS-100K	
R37	180K		B54184	BTS-180K	
R38	1.5Meg		B54155	BTS-1.5Meg	
R39	100K		B54104	BTS-100K	
R40	68K		B54683	BTS-68K	
R41	82K		B54823	BTS-82K	
R42	680Ω		B54681	BTS-680	
R43	330K		B54334	BTS-330K	
R44	4700Ω		B54472		
R45	470Ω	1	C85471	BTA-470	
R46	330Ω	1	C84331	BTA-330	
R47	180K		B54184	BTS-180K	

ITEM No	RATING OHMS	WATT	Wells-Gardner Part No	IRC Part No	NOTES
R48	2.2Meg		B54335	BTS-2.2Meg	
R49	220K		B54824	BTS-220K	
R50	68Ω		B54684	BTS-680K	
R51	47K		B54473	BTS-47K	
R52	68000		B54683	BTS-6800	
R53	4700Ω		B54674	BTS-4700	
R54	680K		B54684	BTS-680K	
R55	470K		B54474	BTS-470K	
R56	22K		B54223	BTS-22K	
R57	470K		B54474	BTS-470K	
R58	2.2Meg		B54335	BTS-2.2Meg	
R59	100Ω		B54101	BTS-100	
R60	82000Ω		B54823	BTS-8200	
R61	15K		B55153	BTS-15K	
R62	3500Ω	1	C94681	BTA-680	
R63	560Ω				
R64	560Ω				
R65	220K		B54224		
R66	330K		B54334		
R67	220K		B54824		
R68	150K		B54124		
R69	47K		B54473	BTS-47K	
R70	33K		B54823		
R71	330K		B54334		
R72	39000		B54592		
R73	82K		B54823		
R74	33K		B54338		
R75	10K		B55103	BTS-10K	
R76	1Meg		B54105	BTS-1Meg	
R77	56K		B54563	BTS-56K	
R78	68Ω		B55683	BTS-68	
R79	470K		B54474	BTS-470K	
R80	10K	3	D84105	BTS-10K	
R81	100Ω	3	D84101	BTS-100	
R82	68000Ω		B54563	BTS-5600	
R83	1700Ω	10	43X384	3/4A-4750	
R84	2Ω	10	43X390	PW10-2	
R85	30Ω		43X339		
R86	6.8Ω	10	43X393		

TRANSFORMER (MISC.)

ITEM No	RATING PRI.	SEC. 1	SEC. 2	SEC. 3	Wells-Gardner Part No	Halldorson Part No.	Merit Part No.	Stancor Part No.	Thordarson Part No.	Triad Part No.
T1	117VAC	6.3V			54X07 ①	F5511 ②③	P-2944 ③	P-8134 ③ ③	21F98 ②③	F-13X ②
	② 0A	② 2A								

① 54X06 alternate part number.
② Drill one new mounting hole.
③ Tape center tap on secondary winding.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	Wells-Gardner Part No.	Halldorson Part No.	Merit Part No.	RCA TYPE No.	Ram Part No.	Stancor Part No.	Thordarson Part No.	Triad Part No.
T2	Vert Osc	54X10	B5702	A-3003	209T1 ①	V405	A-8135	26A03	A-97X
T3	Horiz. Output	53X338A	F5649 ①	HVO-38	230T1 ①	20384 ①	RO-3585 *	F1J-16K ①	D-80 ①
	Alt. Horiz. Output	53X359		* ①	* ①		* ①		
T4	Vert. Output	51X173A	21900 ②①	A-3823 ①		V303 ①②	A-8148 ②	26B75 ②①	A-18EX ①
	Alt. Vert. Output	51X173	21900 ②①	A-3823 ①		V303 ①②	A-8148 ②	26B75 ②①	A-18EX ①
T5A	Yoke-Horiz. (24MH)	5A3547-1B	DF807 ②③	MDF-32 ③	235D1 ②③	Y90216/43 ②③	DY-18A ③	Y-16 ②③	Y-41 & NW1 ②
B	(90°) Vert. (39MH)								
	Alt. Yoke	9A2287	DF807 ②③	MDF-32 ③	235D1 ②③	Y90216/43 ②③	DY-18A ③	Y-16 ②③	Y-41 & NW1 ②
M5	Yoke Rear Cover & Centering Device	5A435							YC1 CL1
	Yoke Clamp	180X61							

① Drill new mounting hole(s).
② Use 8 to 1 turns ratio.
③ Connect as auto transformer.
④ Cut and tape green lead.
⑤ Mount with leads out top and connect same as original using original horizontal damping network.
⑥ Use original rear cover and centering device.
* This part may be superceded by Parts Manufacturer's introduction of special unit for this application.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
	8	9	9	9	9	8	9	9
	3	7 or 5	7 or 5	7 or 5	7 or 5	3	7 or 5	7 or 5
	2	See Note ② NC	See Note ② NC	See Note ② NC	See Note ② NC	2	See Note ② NC	See Note ② NC
	1	1	1	1	1	1	1	1
Special Notes		①	①	①	①		①	①

① Install new damping network, consisting of approx. 100MMF ② 2KV and 1000Ω ③ 1 watt, across horizontal yoke terminals #3 and #7.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	SEC.	Wells-Gardner Part No.	Halldorson Part No.	Merit Part No.	Thordarson Part No.	Triad Part No.	NOTES
T6	6200Ω	8-8Ω	51X180	Z2000 ①	A-3900 ①	A-3327	24B80 ①	8-51MC ① Drill one new mounting hole. Tape center tap on primary winding.

SPEAKER

ITEM No.	TYPE SIZE	FIELD	V C IMP	Wells-Gardner Part No.	QUAM Part No.	NOTES
SP1	6" 5"	PM PM	8-8Ω 8-8Ω	12A538 12A540 ①	6A1827 5A07N26 4	① Alternate part number

COILS (RF-IF)

ITEM No.	USE	Wells-Gardner Part No.	MEISSNER Part No.	MERIT Part No.	MILLER Part No.	NOTES
L1	IF Coupling Coil	9A3268			6235	
L2	1st. Video IF	9A3268		TV-131	6235	
L3	2nd. Video IF	9A3268			6235	Includes 47. 25MC trap and Cap.
L4	3rd. Video IF	9A3264			6231	Includes 4i. 85MC trap, cap. and resistor.
L5	Tweet Choke	9A3275				30 Microhenries
L6	Shunt Peaking Coil	36A12		TV-184 *	6180 *	180 Microhenries, wound on 2MC resistor
L7	6.5MC Trap	9A3266	30-1004	TV-151	1459	
L8	Series Peaking Coil	39A35		TV-180 ▲	6233 ▲	350 Microhenries, wound on 6800Ω resistor
L9	Shunt Peaking Coil	36A23		TV-185 *	6181 *	225 Microhenries, wound on 2200Ω resistor
L10	1st. Sound IF	9A3266	30-1004	TV-151	1469	
L11	2nd. Sound IF	9A3268	17-2496	TV-113	6235	
L12	Quadrature Coil	9A3267	30-1008	TV-112	1480	
L13	RF Choke	9A2280	19-1001		4804	1.5 Microhenries

* Parallel with 22K resistor
▲ Parallel with 68000 resistor
* Parallel with 2200Ω resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	SEC.	Wells-Gardner Part No.	MEISSNER Part No.	MERIT No.	MILLER Part No.	RCA TYPE No.	Ram Part No.	Thordarson Part No.	NOTES
L14	75Ω		9A3271						R8-7 *	Tapped ① 25Ω, 12.4 to 48.5 Millihenries Horiz. Freq 7.5 to 30 Millihenries Lin. Waveform
L15	80Ω		9A3272							

* Enlarge mounting hole.

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	D C RESISTANCE	INDUCTANCE @ CURRENT 1000 °C)	Wells-Gardner Part No.	Halldorson Part No.	Merit Part No.	Stancor Part No.	Thordarson Part No.	Triad Part No.
L16	.358A	40Ω	.7 HY.	51X95-2	C5017 ①	C-2996 ①	C-2326 ①	36C44 ①	C-27X

① Drill one new mounting hole.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Wells-Gardner Part No.	REPLACEMENT DATA
K1	Ant. Input	470MMF, .3-1Meg	76X21	Centralab RC-471
K2	Ant. Input	470MMF, .3-1Meg	76X21	Centralab RC-471
K3	Chassis Isolation	470MMF, .3-1Meg	76X21	Centralab RC-471
K4	Vert. Integrator	2000MMF, 5000MMF, 8000MMF, 22K, 82000, 82000	76X7	Aerovox PA110 Centralab PC-100 Cornell Dubilier 115TMU Erie 1405-1 Sprague V-1

RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	Wells-Gardner Part No.	FEDERAL Part No.	GENERAL ELECTRIC Part No.	INTERNATIONAL Part No.	MALLORY Part No.	SARKES TARZIAN Part No.	NOTES
M1	.385A	56X16 ①	1090A ①	1N1007 ②	RS3005L ①	66300A ①	300 ①	
M2	.385A	56X16 ①	1090A ①	1N1007 ②	RS3005L ①	66300A ①	300 ①	

① Selenium type. ② Germanium type.

PARTS LIST AND DESCRIPTIONS (Continued)

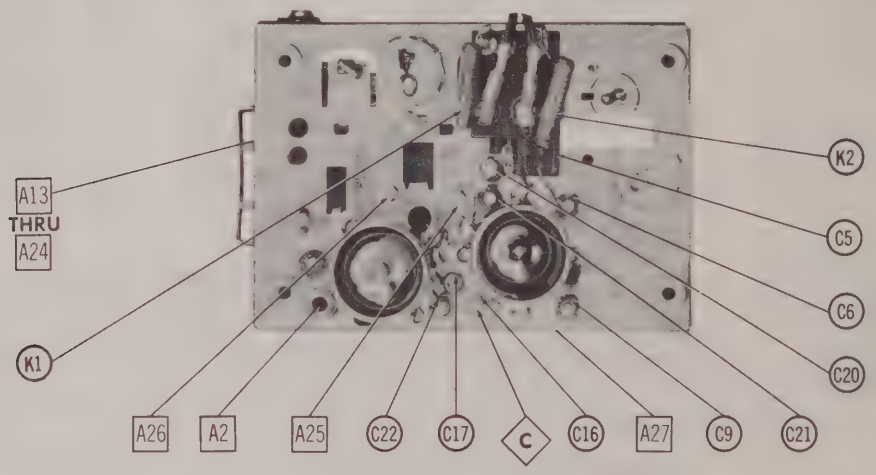
CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		Wells-Gardner PART No.	CBS PART No.	SYLVANIA PART No.	
M3	1N295 *		1N60	1N60	Video Det. (Pigtail)

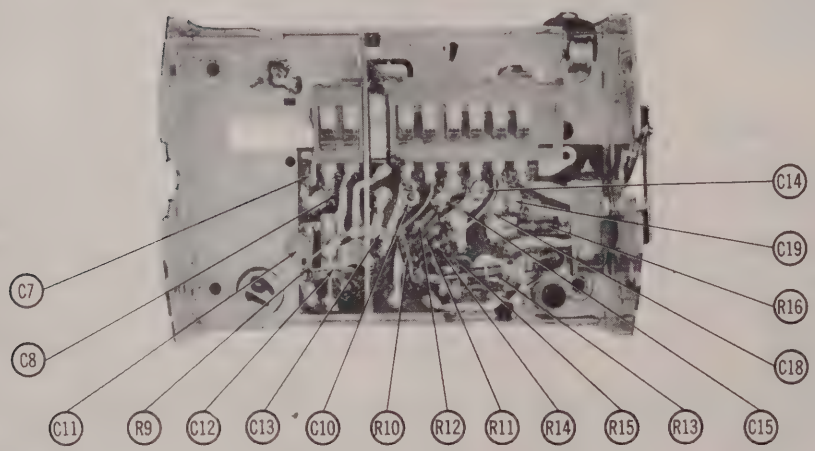
* A CK706 or 1N60 may be used in this application.

MISCELLANEOUS

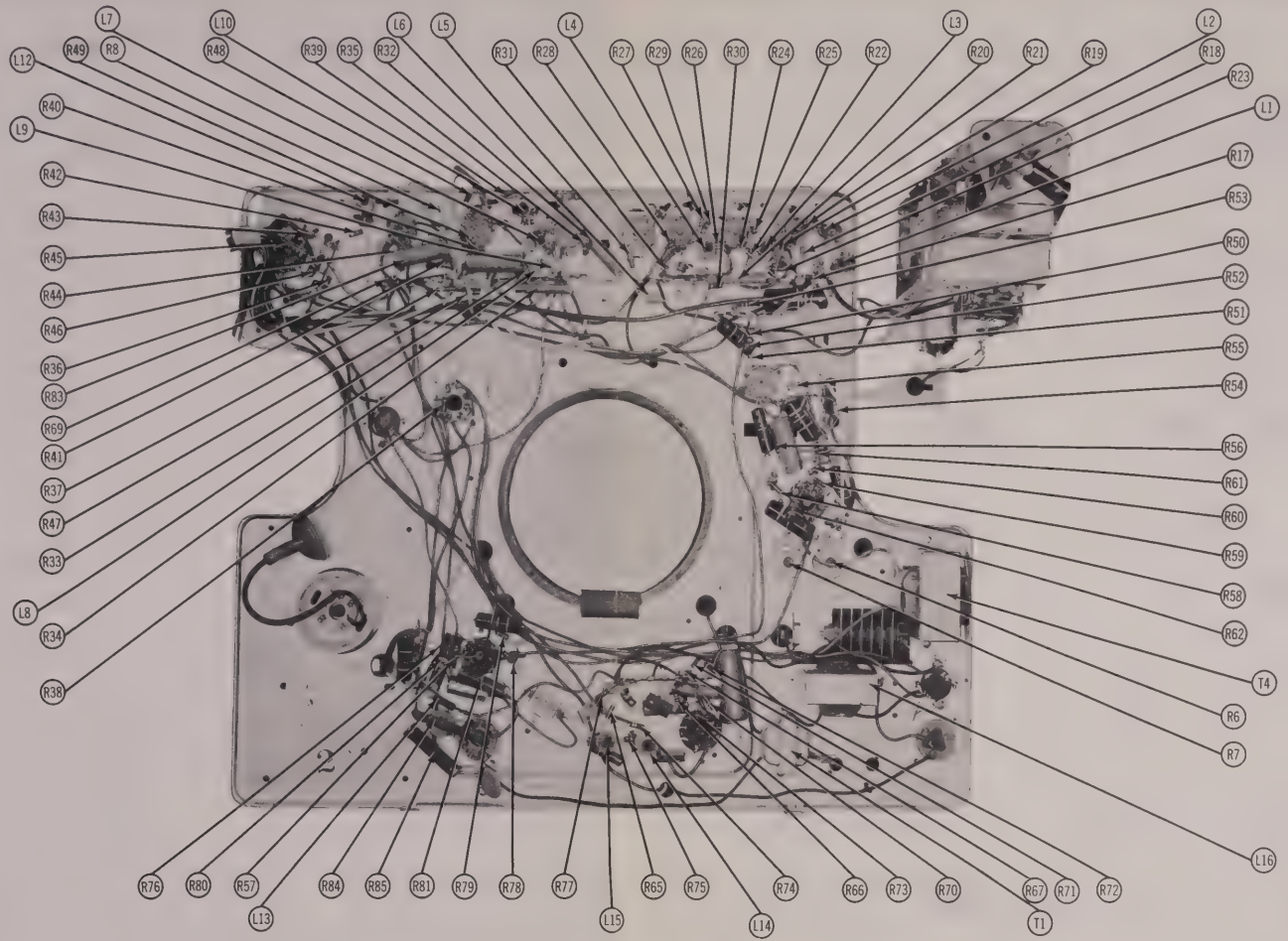
ITEM No.	PART NAME	Wells-Gardner PART No.	NOTES
M4	Dial Light		#51 Type (A type #15 may be used in some versions)
M5	Tuner	25A1148-D	VHF
	Tuner	25A1145	UHF-VHF
	Tuner	25A1143	VHF
M6	Video Det. Assy.	9A2370	Includes 4th. Video IF, peaking coil, caps., M3
M7	Switch	2A464	On-off (Push type)
M8	Centering Device	2A435	Includes rear yoke cover
M9	Ion Trap	2A421	
M10	Circuit Breaker	2A461	
	Safety Glass	17X193-1	Tinted
	Knob	10A861-1	Control (4 used)
	Knob	10A870-11	Channel Selector (VHF, Mahogany Cabinet)
	Knob	10A871-1	Fine Tuning (VHF, Mahogany Cabinet)
	Knob	10A872-1	Volume (VHF, Mahogany Cabinet)
	Knob	10A873-1	Contrast (VHF, Mahogany Cabinet)
	Knob	10A870-12	Channel Selector (VHF, Oak Cabinet)
	Knob	10A871-2	Fine Tuning (VHF, Oak Cabinet)
	Knob	10A872-2	Volume (VHF, Oak Cabinet)
	Knob	10A873-2	Contrast (VHF, Oak Cabinet)
	Knob	10A875-1	VHF Channel Selector (UHF, Mahogany Cabinet)
	Knob	10A876	UHF Channel Selector (UHF, Mahogany Cabinet)
	Knob	S-38A186	Fine Tuning (UHF, Mahogany Cabinet)
	Knob	10A874-1	Volume (UHF, Mahogany Cabinet)
	Knob	S-38A187	Contrast (UHF, Mahogany Cabinet)
	Knob	10A875-2	VHF Channel Selector (UHF, Oak Cabinet)
	Knob	S-38A186	UHF Channel Selector (UHF, Oak Cabinet)
	Knob	10A877-1	Fine Tuning (UHF, Oak Cabinet)
	Knob	10A874-2	Volume (UHF, Oak Cabinet)
	Knob	S-38A187	Contrast (UHF, Oak Cabinet)



RF TUNER TOP VIEW

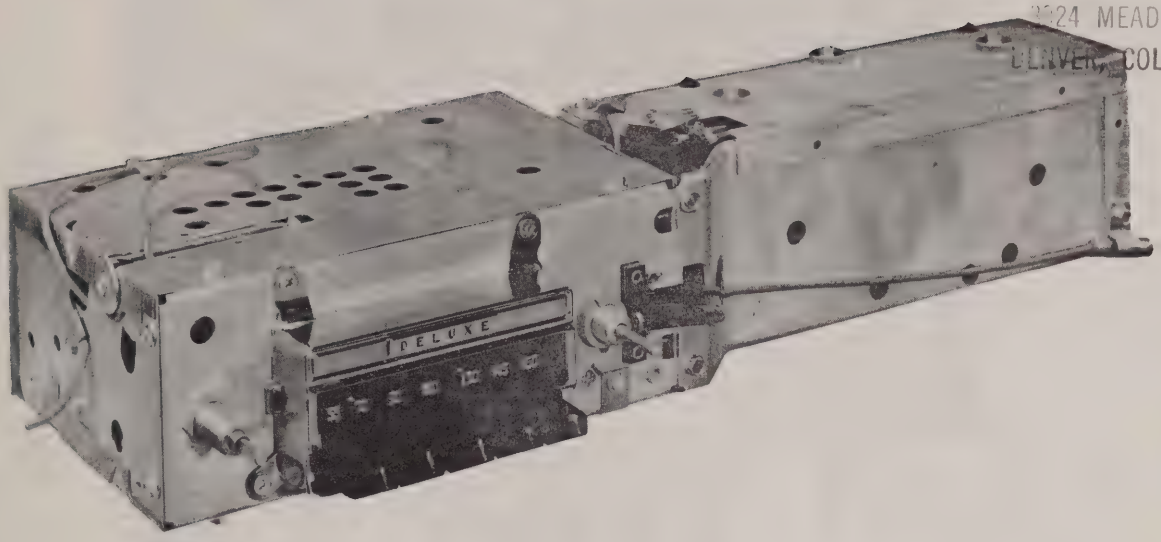


RF TUNER BOTTOM VIEW



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

L. F. BLANKENS
2324 MEADE ST.
DENVER, COLORADO



OLDSMOBILE
MODEL 989001

TRADE NAME	Oldsmobile Model 989001 (For 1957 Oldsmobile Automobiles)
MANUFACTURER	Delco Radio Div., G. M. Corp., Kokomo, Indiana
TYPE SET	Battery Operated Custom Built AM Automobile Receiver
TUBES (Seven)	Types 12BA6 RF Amplifier, 12BE6 Converter, 12BA6 IF Amplifier, 12BF6 Det.-AVC-AF Amp., (2) 12V6GT Output, 0Z4 Rectifier
POWER SUPPLY	12 Volt Storage Battery — RATING 3.4 Amp. @ 12.6 Volts DC
TUNING RANGE—BROADCAST	540KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting. Tone control to "Treble".

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1MFD	High side to pin 7 (grid) of 12BE6 (V2). Low side to chassis.	262KC (400~ Mod.)	High frequency end stop	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
	Check setting of oscillator core (A8). Rear of core should be 1 5/8" from mounting end of coil form.						
2	68MMF	High side to Antenna Receptacle. Low side to chassis.	1615KC	High frequency end stop	Across voice coil	A5, A6, A7	Adjust for maximum output in order given.
3	"	"	600KC	Tune to 600KC signal	"	A9, A10	"
4	"	"	1615KC	High frequency end stop	"	A6, A7	"
5	"	"	1100KC	Tune to 1100KC signal	"		If necessary, adjust pointer (with pointer adjustment screw) to coincide with 1100KC on dial.
6	With radio installed in car and antenna fully extended, tune in a weak station between 600KC and 1000KC, and adjust A7 for maximum volume.						

PUSHBUTTON ADJUSTMENT

1. Pull pushbutton to the left and out.
2. Tune manually to desired station, press button in firmly.
3. Repeat on remaining pushbuttons.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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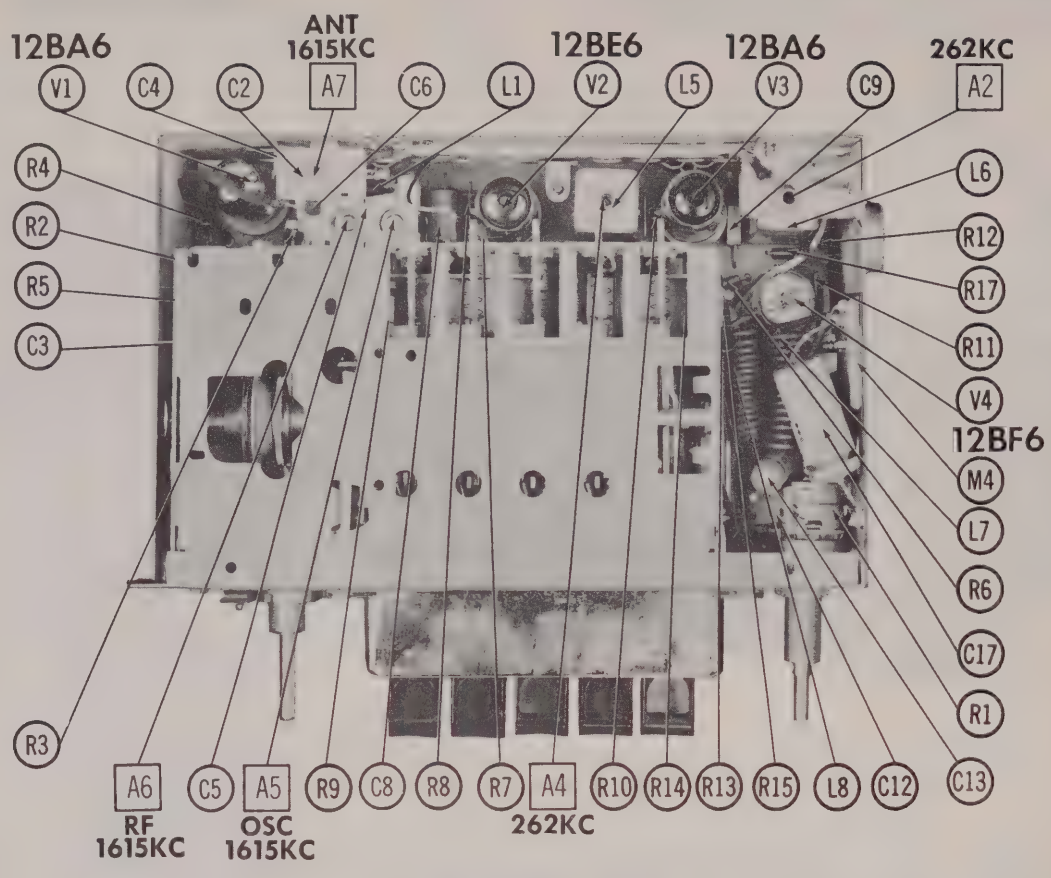
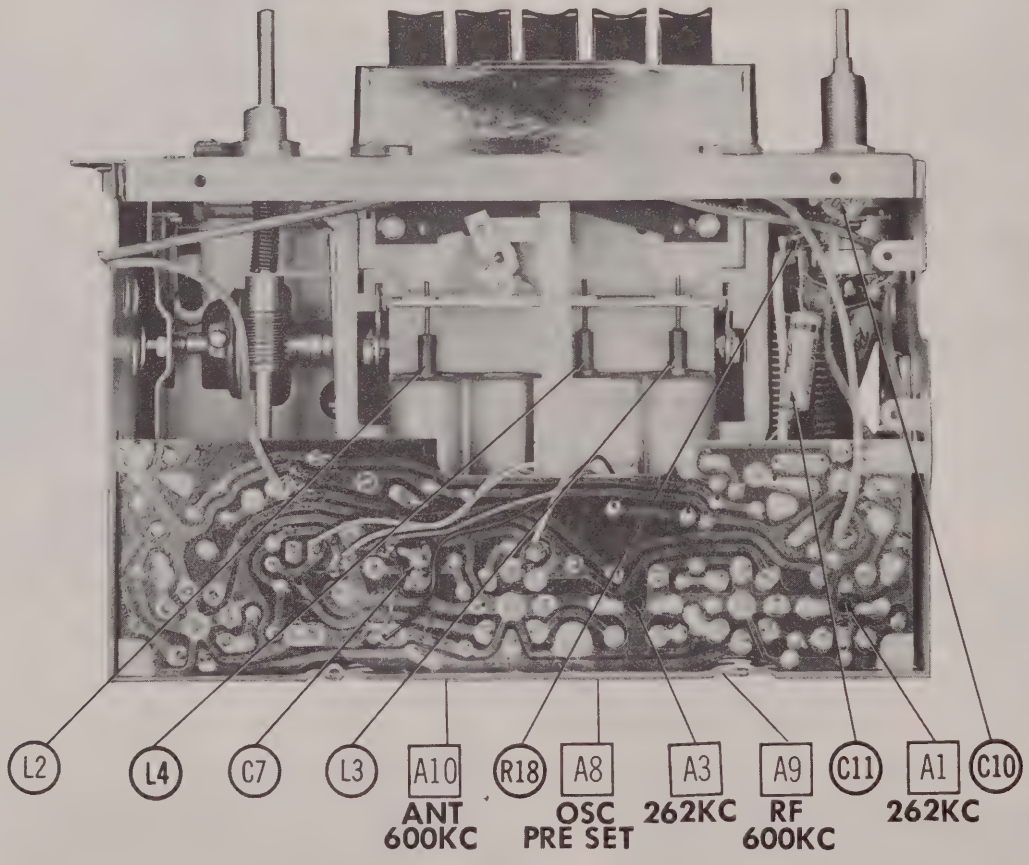


CHASSIS-TOP VIEW



CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	12BA6	
V2	Converter	12BE6	
V3	IF Amplifier	12BA6	
V4	Det. -AVC-AF Amplifier	12BF6	

ITEM No.	USE	TYPE	NOTES
V5	Output	12V6GT	
V6	Output	12V6GT	
V7	Rectifier	0Z4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	DELCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■20	400	6322	AFH3-120	C0990	FP345. 8	TMT-106	T-550	TVL-3678
B	▲20	400							
C	20	25							

FIXED CAPACITORS

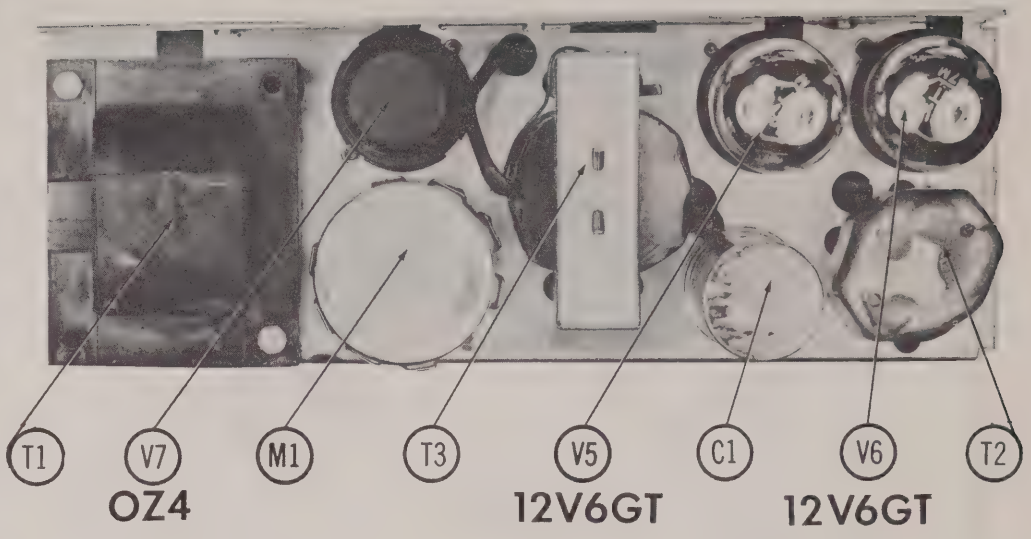
Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	DELCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2A			7268811							
B										
C3	.047	200	6612	BPD-05	DF-503	CUB2S47		GEM-2147	2TM-S47	
C4	15		6361	BPD-000015	DD-150	L10Q15	ED-15	UC-5415	5GA-Q15	
C5A										
B			7268828							
C										
D										
C6	39		6366	BPD-000039	DD-390	L10Q39	ED-39	UC-5439	5GA-Q39	
C7	200		7268904	1469-0002	TCZ-200	22R5T2	TCO-200		MS-32	5%
C8	.047	400	6612	BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	
C9	220	500	6363	1468-00022	D6-221	5W5T22	ED-220	UC-5322	1FM-322	
C10	2000		6352	BPD-002	DD-202	BYA10D2	ED-002	DC522	5HK-D2	
C11	.01	400	6610	BPD-01	DD-103	CUB4S1	ED-10000	GEM-411	4TM-S1	
C12	220	500	6375	1468-00022	D6-221	5W5T22	ED-220	UC-5322	1FM-322	
C13	.005	600	6631	BPD-005	D6-502	CUB6D5	ED-005	GEM-625	6TM-D5	
C14	.1	400	6613	P488N-1	DF-104	CUB4P1		GEM-401	4TM-P1	
C15	100		G-101	BPD-0001	DD-101	L10T1	ED-100	UC-531	5GA-T1	
C16	.003	1000	6563	P1088N-003	DD30-302	CUB10D3		GEM-1023	10TM-D3	
C17	.47	100	6692	P288N-47		CUB2P47		GEM-2047	2TM-P47	
C18	.1	200	6690	P288N-1	DF-104	CUB2P1		GEM-201	2TM-P1	
C19	.47	100	6692	P288N-47		CUB2P47		GEM-2047	2TM-P47	
C20	.007	1600	6567	P1688N-007	DD16-702	CUB16D7		GEM-1627	MB-D7	

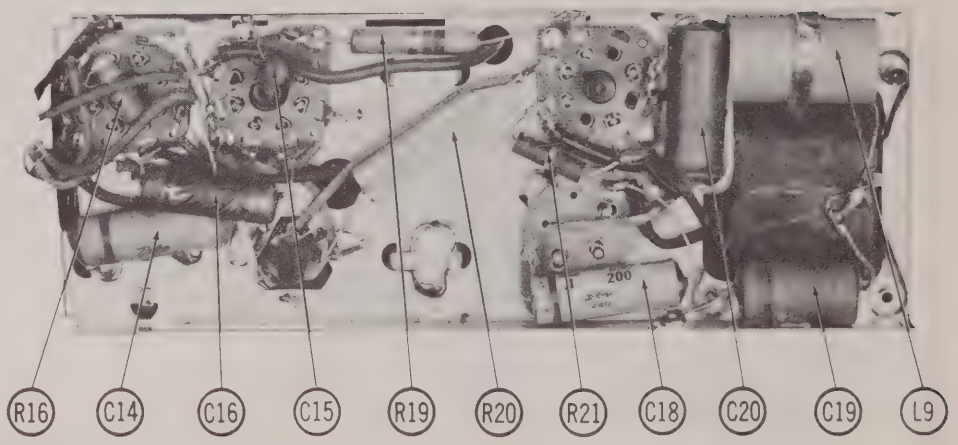
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	DELCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	2Meg	½	7269055				UE1774S	Tone
B	330K	½					Not Req.	Volume, Tap ⓐ 100K
C	Switch						Not Req.	

CHASSIS—TOP VIEW



CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	DELCO PART No.	IRC PART No.	
R2	2.2Meg		1239	BTS-2.2Meg	
R3	10K	1	1174	BTA-10K	
R4	68Ω		1111	BTS-68	
R5	330K		1229	BTS-330K	
R6	1Meg		1235	BTS-1Meg	
R7	100Ω		1113	BTS-100	Note 1
R8	22K		1215	BTS-22K	
R9	15K	2	1277	BTB-15K	
R10	220Ω		1117	BTS-220	Note 2
R11	1Meg		1235	BTS-1Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	DELCO PART No.	IRC PART No.	
R12	47K		1219	BTS-47K	
R13	1000Ω		1125	BTS-1000	
R14	2200Ω		1129	BTS-2200	
R15	1Meg		1235	BTS-1Meg	
R16	47K	1	1259	BTA-47K	
R17	3.3Meg		1241	BTS-3.3Meg	
R18	47K		1219	BTS-47K	
R19	360Ω 5%	1	7234563		Note 3
R20	1800Ω	3			
R21	15K	1	1253	BTA-15K	

Note 1. Not used in some versions.
Note 2. Some versions may use 390Ω (Part #1120).
Note 3. MFGR. states to replace R20 with 2700Ω 2W (Part #1204) & 5600Ω 1W (Part #1171) connected in parallel.

TRANSFORMER (VIBRATOR)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	DELCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	12.6VCT @ 1.9A	540VCT @ .068A			6067	V-3902	P-2861	P-6489	22R52	V31

TRANSFORMER (AUDIO INPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	DELCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2			1220902						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	DELCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T3	8900Ω CT	3-4Ω	7268860	Z1011 ①	A-2901 ②	A-3850 ②	22S56 ①	S-53X ②	① Use original channel mounting frame ② Drill new mounting holes

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	DELCO PART No.	QUAM PART No.	
SP1	6"X9"	PM	3-4Ω	7269180	69A3	

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		DELCO PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coupling Coil	7255738	19-1004	BC-565	4610	6.5 Microhenries
L2	Antenna Coil	1221050				
L3	RF Coil	1221050				
L4	Osc. Coil	1221051				
L5	Input IF	1220990	16-6756	BC-317		
L6	Output IF	1220992		BC-320		
L7	"A" Lead Choke	1217846				1.4 Microhenries
L8	Fil. Choke	1217846				1.4 Microhenries
L9	Hash Choke	1221077				42 Microhenries

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FRE-QUENCY	REPLACEMENT DATA				NOTES
				DELCO PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	12.6V	115∿	8555	6330	G1602/G883	6330	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA						NOTES
			DELCO PART No.		LITTELFUSE PART No.		BUSS PART No.		
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER	
M2	SFE	7½A	455640		30307.5 (7AG 7½A)		SFE 7½A		

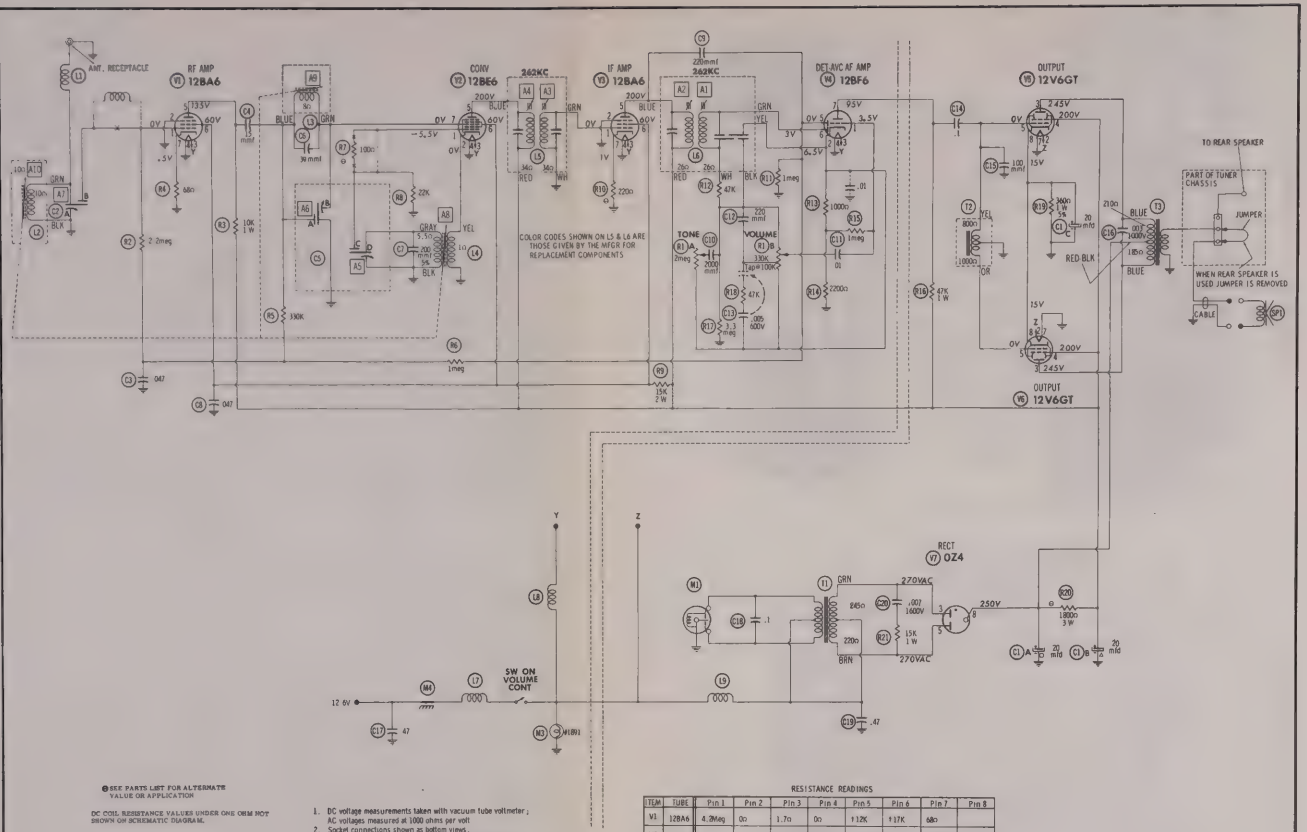
MISCELLANEOUS

ITEM No.	PART NAME	DELCO PART No.	NOTES
M3	Dial Light	456985	#1891
M4	Spark Plate	1220682	

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Printed Panel	7268814-C	
Knob	569556	Control
Knob	569554	Tone
Knob	569555	Dummy
Dial	7269283	



❶ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt
2. Socket connections shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 12.6 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V1	12BA6	4.3Meg	0Ω	1.7Ω	0Ω	†12K	†17K	68Ω	
V2	12BE6	22K	1Ω	1.7Ω	0Ω	†1800Ω	†17K	2.3Meg	
V3	12BA6	34Ω	0Ω	1.7Ω	0Ω	†1800Ω	†17K	220Ω	
V4	12BF6	1Meg	3200Ω	1.7Ω	0Ω	1Meg	3.3Meg	†49K	
V5	12V6GT	NC	1.7Ω	†210Ω	†1800Ω	800Ω	TP	0Ω	360Ω
V6	12V6GT	NC	1.7Ω	†185Ω	†1800Ω	1000Ω	TP	0Ω	360Ω
V7	0Z4	0Ω	NC	245Ω	NC	220Ω	NC	TP	20K(Min)

† MEASURED FROM PIN 8 OF V7
NC NO CONNECTION
TP TIE POINT

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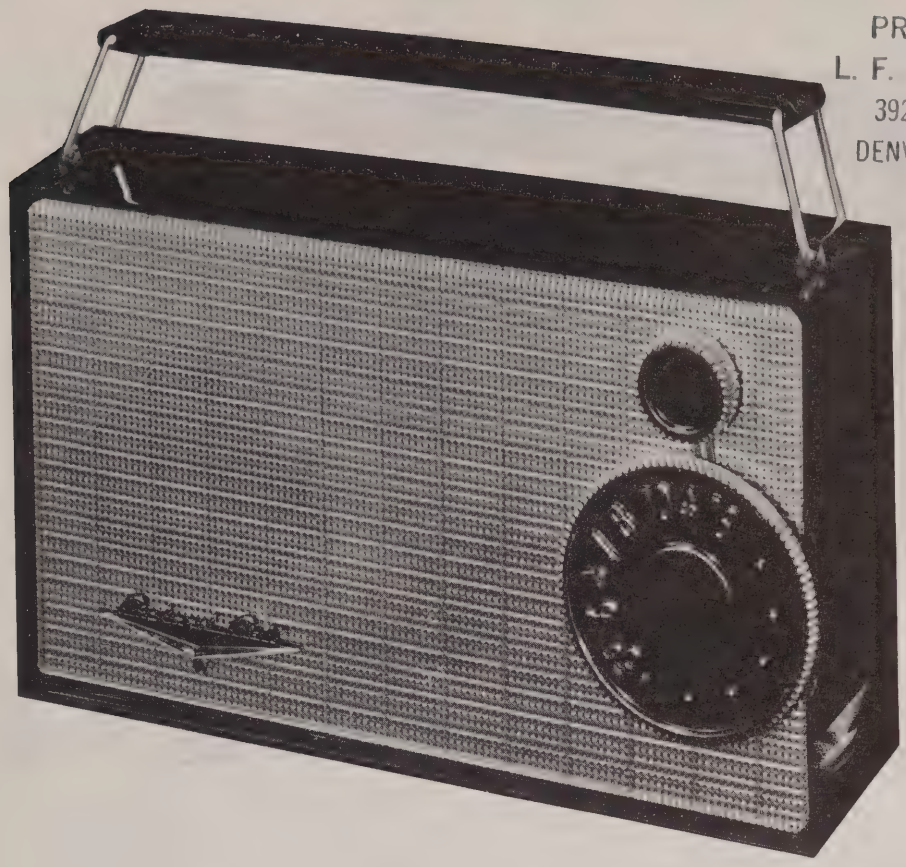
PACKARD-BELL
MODEL 4RB1



PACKARD-BELL
MODEL 4RB1

TRADE NAME	Packard-Bell Model 4RB1
MANUFACTURER	Packard-Bell Co., Service Div., 11th & Hope Sts., Los Angeles 15, Calif.
TYPE SET	Battery Operated Portable AM Receiver
TUBES (Four)	Types 1R5 Converter, 1U4 IF Amplifier, 1U5 Det. -AVC-AF Amp., 3S4 Output
POWER SUPPLY	1.5 Volts DC "A" Supply & 45 Volts DC "B" Supply RATING 270MA@ 1.5 Volts DC & 6.5MA@ 45 Volts DC
TUNING RANGE—BROADCAST	535KC - 1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01MFD	High side to pin 6 (grid) of 1R5 (V1). Low side to chassis.	455KC (400~ Mod.)	Tuning gang fully closed	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2		Loop	1620KC	Tuning gang fully open	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1500KC	Tune to 1500KC signal	"	A6	"

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PARTS LIST AND DESCRIPTIONS

PACKARD-BELL MODEL 4RB1

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	1R5	
V2	IF Amplifier	1U4	
V3	Det. -AVC-AF Amp.	1U5	
V4	Output	3S4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	Packard-Bell PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	10	50	24123	SRE50V10	NL10-50	TT50X10	ML10-50	MMT-0510	TE-1304

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Packard-Bell PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	47		23912							N1400
C3	10000		23862	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C4	2000		23839	BPD-002	DD-202	BYA10D2	ED-002	DC522	5HK-D2	
C5	10000		23862	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C6	100		23914	BPD-0001	DD-101	L10T1	ED-100	UC-531	5GA-T1	
C7	2000		23839	BPD-002	DD-202	BYA10D2	ED-002	DC522	5HK-D2	
C8	10000		23862	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C9	100		23914	BPD-0001	DD-101	L10T1	ED-100	UC-531	5GA-T1	
C10	2000		23839	BPD-002	DD-202	BYA10D2	ED-002	DC522	5HK-D2	
C11	2000		23839	BPD-002	DD-202	BYA10D2	ED-002	DC522	5HK-D2	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Packard-Bell PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	1Meg	1/4	25041A					Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

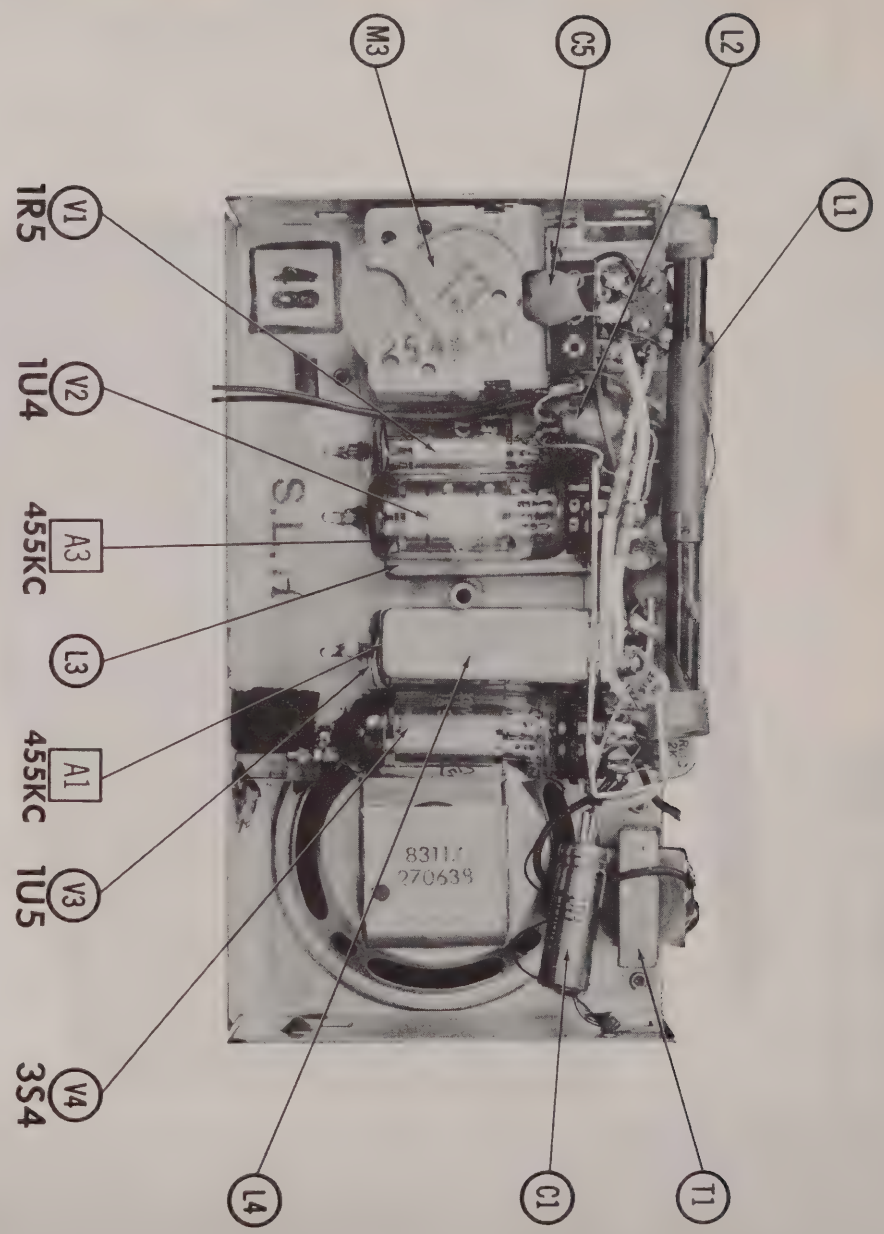
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Packard-Bell PART No.	IRC PART No.	
R2	100K		73949	BTR-100K	
R3	3.3Meg		73967	BTR-3.3Meg	
R4	4.7Meg		73969	BTR-4.7Meg	
R5	47K		73845	BTR-47K	
R6	10Meg		73973	BTR-10Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Packard-Bell PART No.	IRC PART No.	
R7	4.7Meg		73969	BTR-4.7Meg	
R8	1Meg		73961	BTR-1Meg	
R9	3.3Meg		73967	BTR-3.3Meg	
R10	470Ω		73821	BTR-470	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Packard-Bell PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	7300Ω	3-4Ω	89469						

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Packard-Bell PART No.	QUAM PART No.	
SP1	2 1/2"	PM	3-4Ω	83117	25A07	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		Packard-Bell PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Stick	29354				
L2	Osc. Coil	29232				
L3	Input IF	29082	16-6800	BC-348	10-C1	
L4	Output IF	29083	16-6801	BC-349	10-C2	

BATTERIES

ITEM No.	VOLTAGE	Packard-Bell PART No.	REPLACEMENT DATA								NOTES
			BURGESS		EVEREADY		MALLORY		RAY-O-VAC		
			"A"	"B"	"A"	"B"	"A"	"B"	"A"	"B"	
M1	1. 5V		1		635		M-14		16P		
M2	45V			U30		415		M-213		213	

MISCELLANEOUS

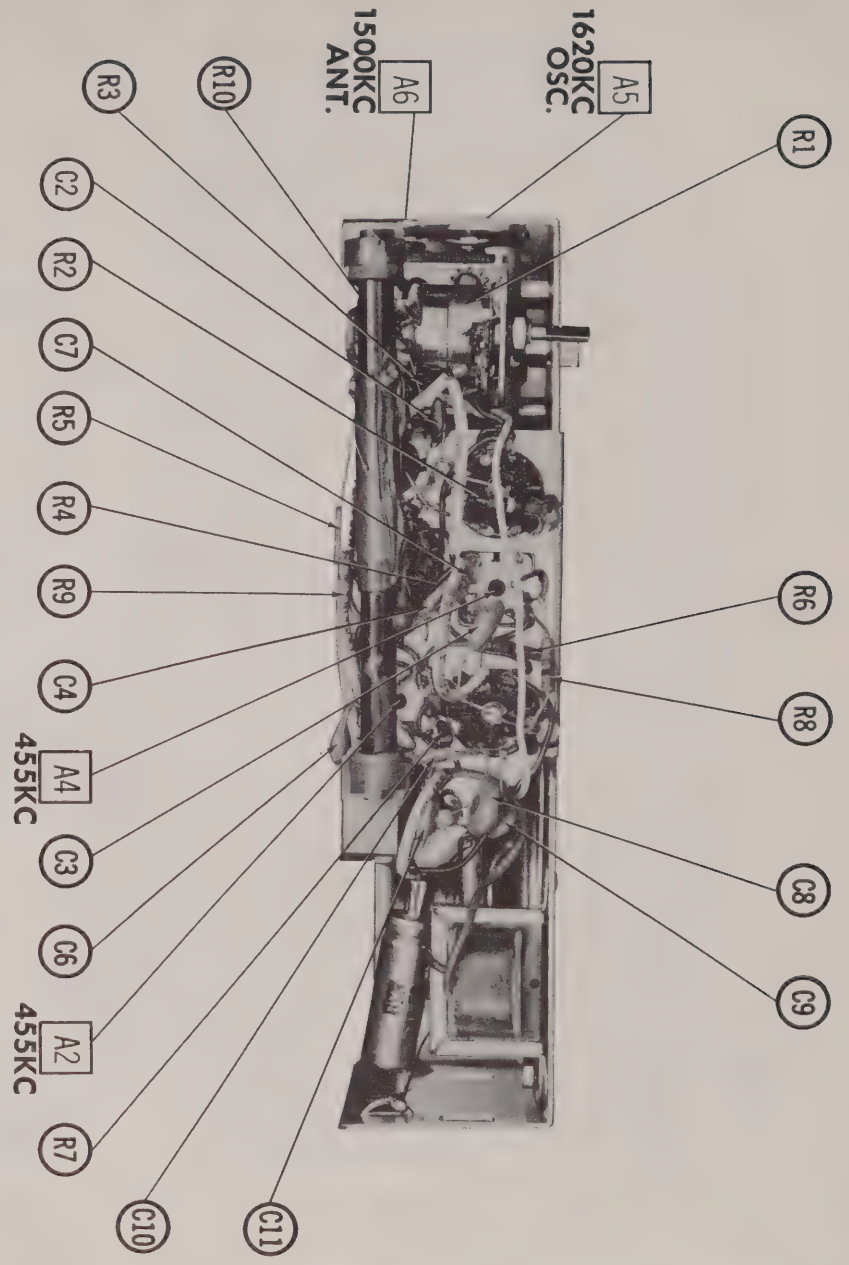
ITEM No.	PART NAME	Packard-Bell PART No.	NOTES
M3	Tuning Cap.	23548	2 Gang (Ant. 21-270MMF, Osc. -28-107MMF)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

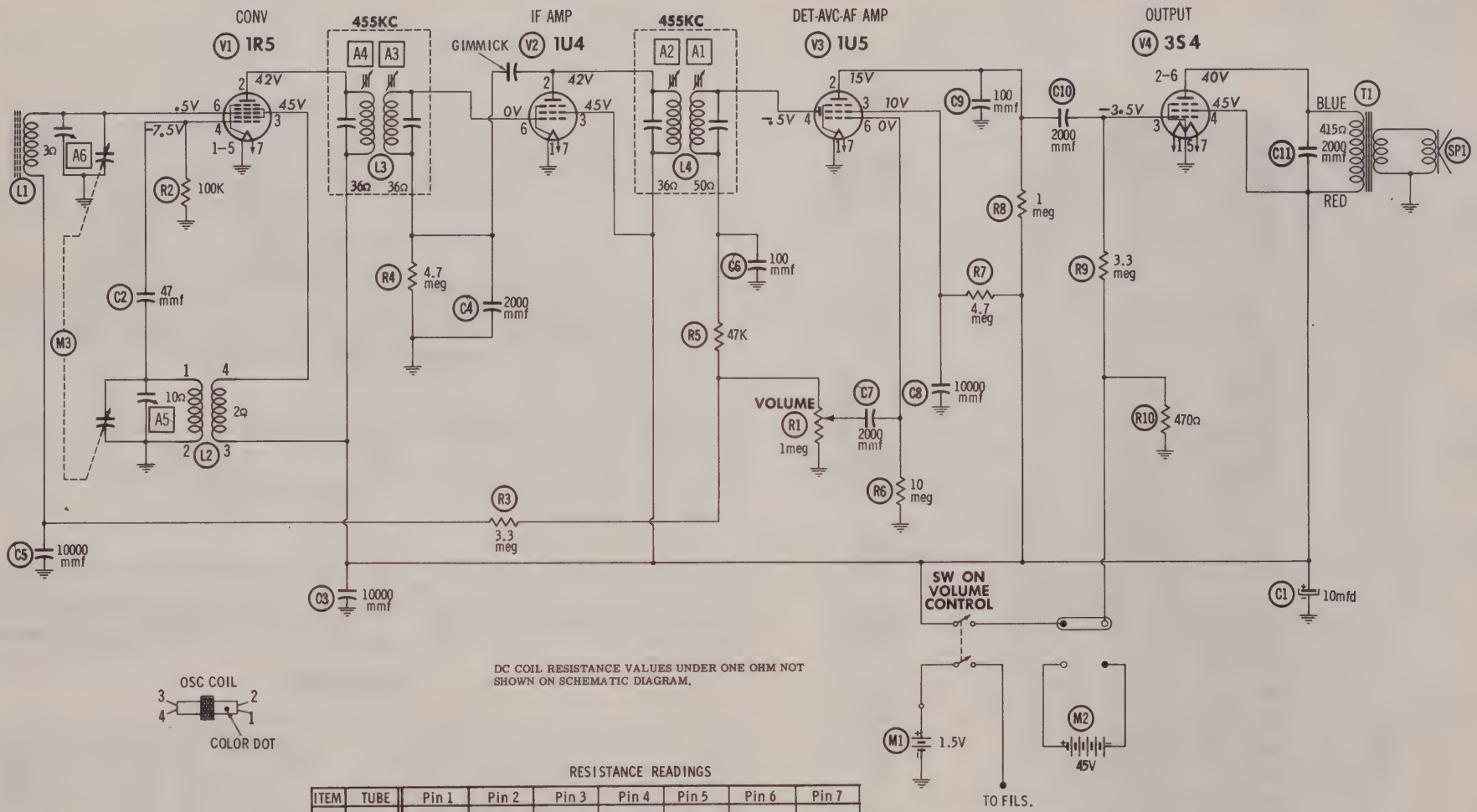
NAME	PART NO.	DESCRIPTION
Knob	52184	Tuning, Plastic
Knob	52188	Tuning, Leather
Knob	52185A	Volume, Plastic
Knob	52189A	Volume, Leather
Cabinet	21137-1B	Plastic
Cabinet	21138C	Leather
Handle	21137-2A	Plastic

CHASSIS—BOTTOM VIEW



PACKARD-BELL MODEL 4RB1

PACKARD-BELL MODEL 4RB1



DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	1R5	•	†36Ω	†2Ω	100K	•	4.3Meg	•
V2	1U4	•	†36Ω	†0Ω	NC	•	4.7Meg	•
V3	1U5	•	†1Meg	†4.7Meg	1Meg	•	10Meg	•
V4	3S4	•	†415Ω	3.3Meg	†0Ω	•	†415Ω	•

• DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE
† MEASURED FROM POSITIVE SIDE OF C1
NC NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum. no signal apllied for voltage measurements.

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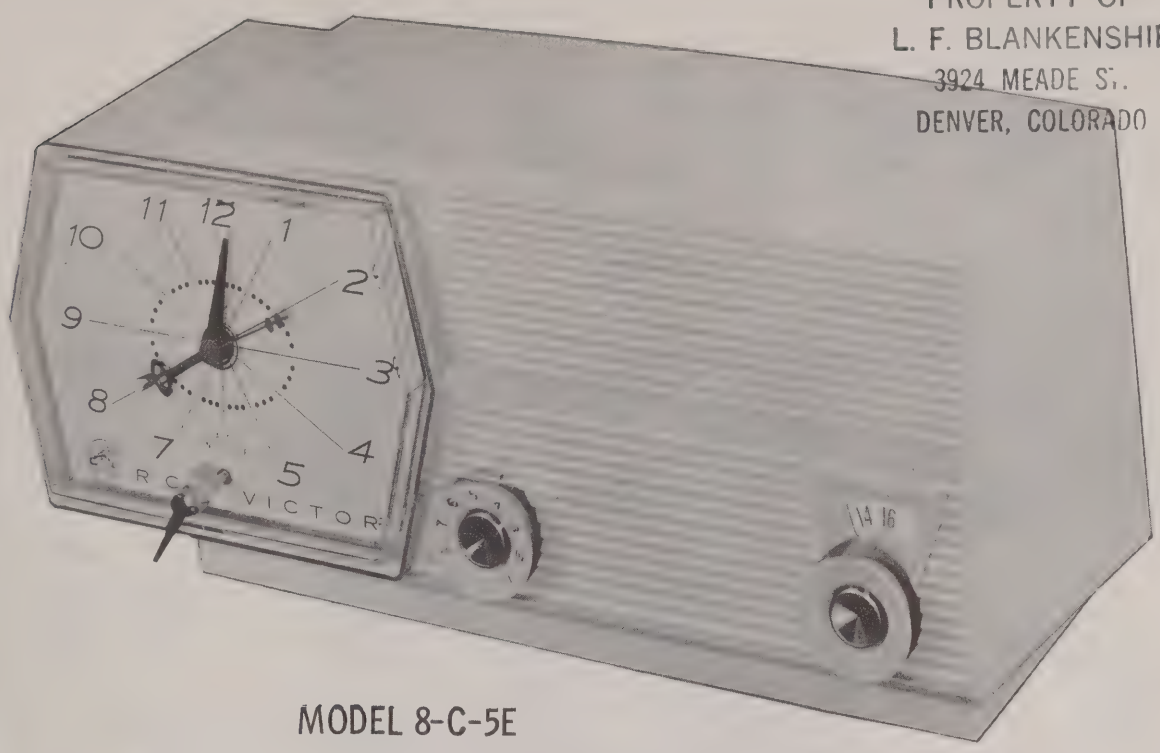
RCA VICTOR MODELS 8-C-5D, E, F, L, 8-C-6E, J, L, M, 8-C-51 (Ch. RC-1179, A)



MODEL 8-C-5E

RCA VICTOR MODELS 8-C-5D, E, F, L, 8-C-6E, J, L, M, 8-C-51 (Ch. RC-1179, A)

TRADE NAME	RCA Victor Models 8-C-5D, E, F, L, 8-C-5l, 8-C-6E, J, L, M (Ch. RC-1179, RC-1179A)
MANUFACTURER	RCA Victor Radio & "Victrola" Div., Radio Corp. of America, Camden 8, N. J.
TYPE SET	AC Operated AM Receiver With Electric Clock
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det. -AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles
RATING	.25 Amp. @ 117 Volts AC (26 Watts)
TUNING RANGE—BROADCAST	540KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in the same relative position to chassis as when the receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01MFD	High side to pin 1 (grid) of 12BA6 (V2). Low side to B-.	455KC (400~ Mod.)	Quiet point near 1600KC	Across voice coil	A1	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2	"	High side to Antenna stator lug on tuning gang. Low side to B-	"	"	"	A2, A3	"
3		Loop	1620KC	Tuning gang fully open	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4		"	1400KC	Tune to 1400KC signal	"	A5	"
5		"	600KC	Tune to 600KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output while rocking tuning gang.

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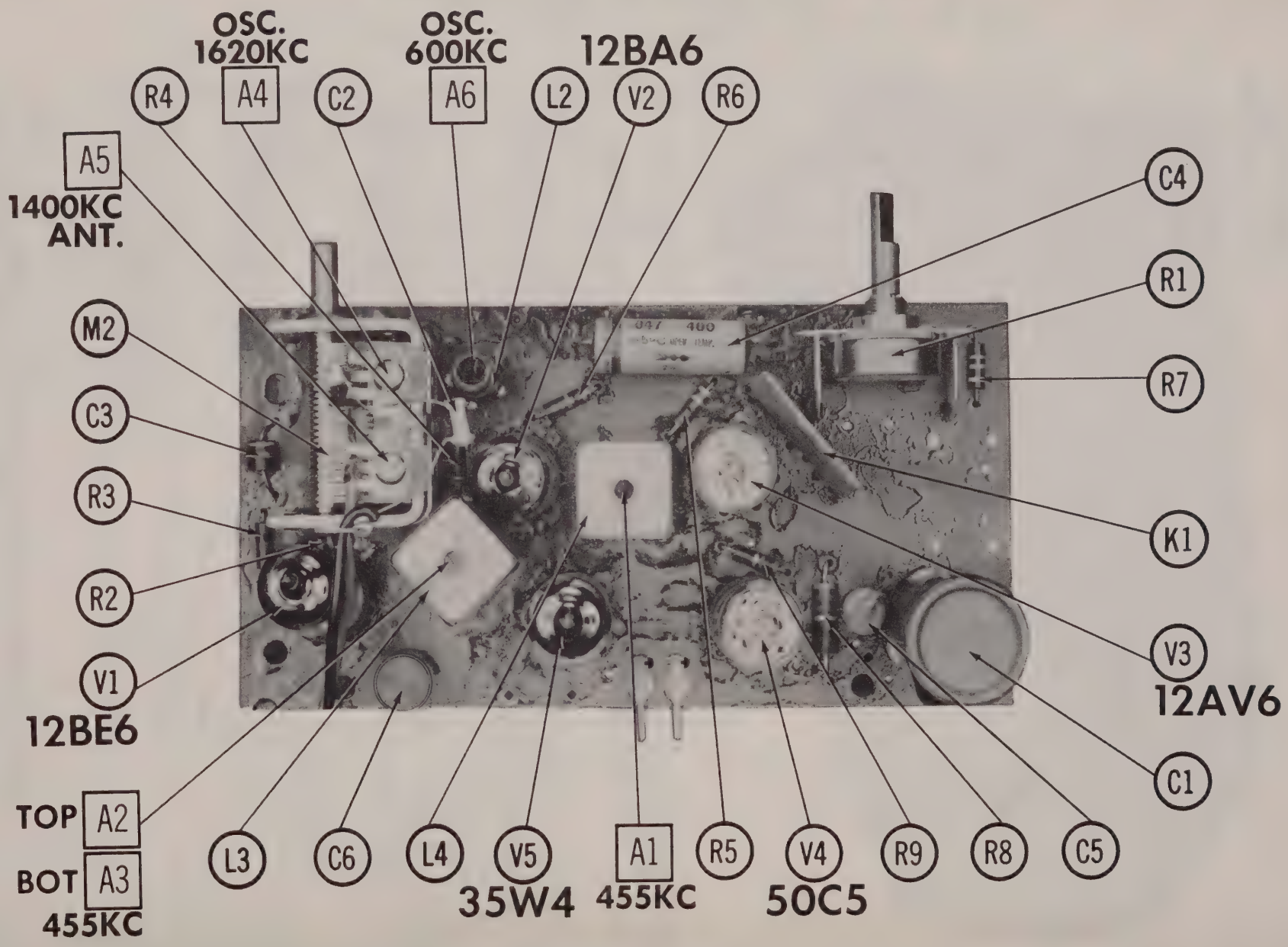


CHASSIS-TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det. -AVC-AF Amp.	12AV6	

ITEM No.	USE	TYPE	NOTES
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	RCA Victor PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	50	150	103197	PRS150V5050	BBRD5515	TCD49		CADP-1550	R2377 *
B	50	150							

* Non catalog item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	5.6		103440				TC3-5.6			N330
C3	56		100085	SI 56	D6-560	LT6Q56	GP-56	UC-5456	5GA-Q56	
C4	.047	400	73553	BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	
C5	.012	400	103195					GEM-6112		
C6	.047	400	103239	BPD-05	DF-503	BC6S47J		ACE6147	4SE-S47	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	RCA Victor PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	1Meg	½	103214					Volume

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RCA Victor PART No.	IRC PART No.	
R2	33K		502333	BTS-33K	
R3	100Ω		502110	BTS-100	
R4	3.3Meg		502533	BTS-3.3Meg	
R5	3.3Meg		502533	BTS-3.3Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RCA Victor PART No.	IRC PART No.	
R6	100Ω		502110	BTS-100	
R7	47K		502347	BTS-47K	
R8	1200Ω	1	512212	BTA-1200	
R9	150Ω		502115	BTS-150	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	RCA Victor PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2400Ω	3-4Ω	79283	Z1102 ①	A-3031 ①	A-3336 ①	24S50A ①	S-16X ①	① Drill new mounting hole.

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	RCA Victor PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	103669	4A07 ①	① Cut off corner to match original.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		RCA Victor PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Antenna	103606				Includes cabinet back, Series 8-C-5, Model 8-C-51
	Loop Antenna	103607				Includes cabinet back, Series 8-C-6
L2	Osc. Coil	103204				
L3	Input IF	103206				
L4	Output IF	103207	16-6780	BC-357	13-PC1	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	RCA Victor PART No.	REPLACEMENT DATA
K1	Audio Coup. Net.	5000MMF, 220MMF, 5000MMF, 125MMF, 250MMF, 6.8Meg, 470K, 470K	103205	

MISCELLANEOUS

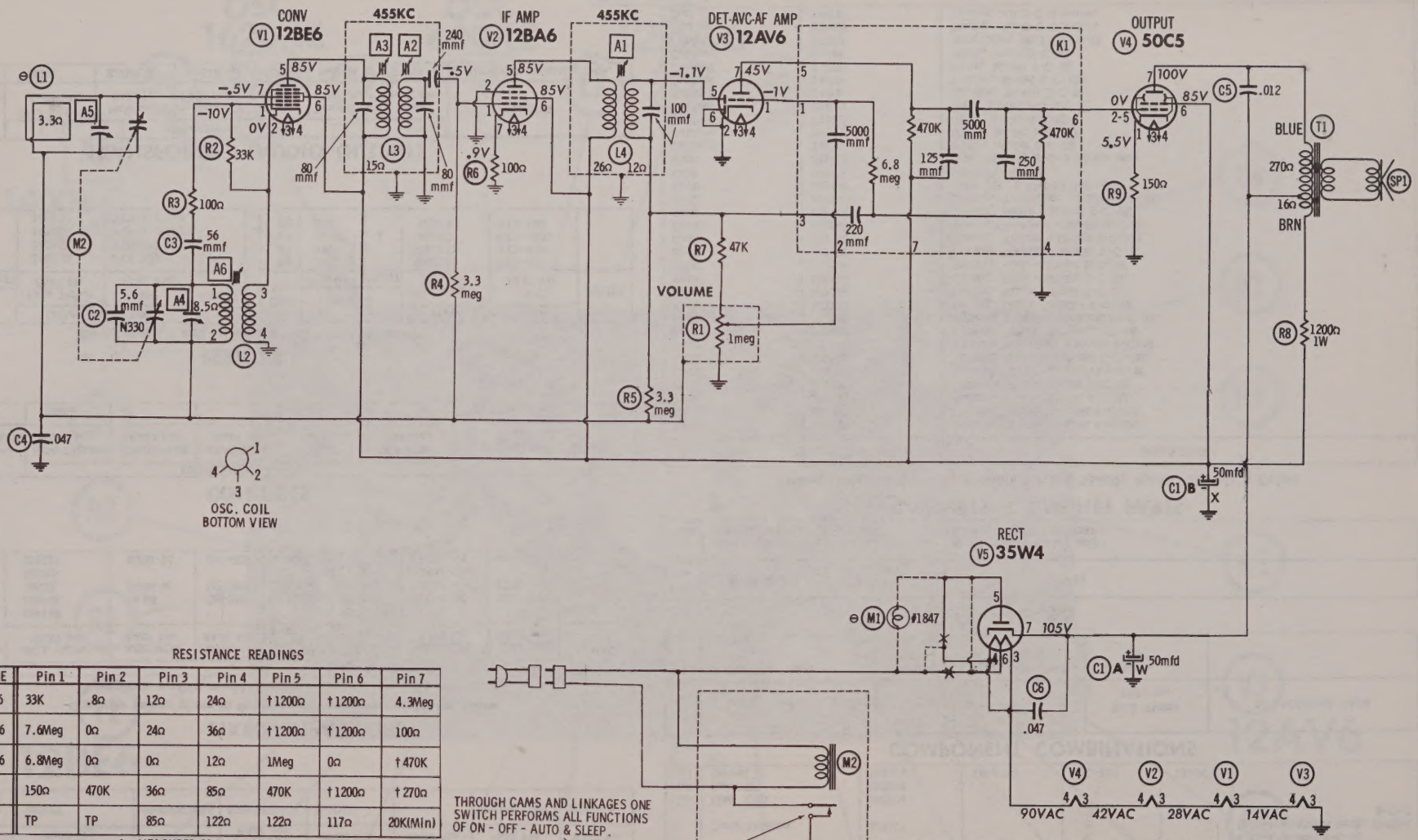
ITEM No.	PART NAME	RCA Victor PART No.	NOTES
M1	Dial Light	103211	#1847, 8-C-6 Series only
M2	Tuning Cap.	103209	2 Gang (Ant. 22-410MMF)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	103591	Volume, White - Model 8-C-5E
Knob	103595	Volume, Black - Model 8-C-5D
Knob	103593	Volume, Blue - Model 8-C-5L
Knob	103597	Volume, Pink - Model 8-C-5F
Knob	103731	Volume, Maroon - Model 8-C-5I
Knob	103546	Volume, Yellow - Model 8-C-6M
Knob	103544	Volume, Charcoal - Model 8-C-6J
Knob	103540	Volume, White - Model 8-C-6E
Knob	103542	Volume, Turquoise - Model 8-C-6L
Knob	103590	Tuning, White - Model 8-C-5E
Knob	103594	Tuning, Black -Model 8-C-5D
Knob	103592	Tuning, Blue - Model 8-C-5L
Knob	103596	Tuning, Pink - Model 8-C-5F
Knob	103732	Tuning, Maroon - Model 8-C-5I
Knob	103545	Tuning, Yellow - Model 8-C-6M
Knob	103543	Tuning, Charcoal - Model 8-C-6J
Knob	103539	Tuning, White - Model 8-C-6E
Knob	103541	Tuning, Turquoise - Model 8-C-6L
Knob	103589	Time Set, 8-C-5 Series only
Knob	103221	ON-OFF-Alarm
Knob	103222	Sleep Switch, 8-C-6 Series only
Cabinet	Y4081	White, Model 8-C-5E
Cabinet	Y4084	Black, Model 8-C-5D
Cabinet	Y4082	Blue, Model 8-C-5L
Cabinet	Y4083	Pink, Model 8-C-5F
Cabinet	Y4113	Maroon, Model 8-C-5I
Cabinet	Y4088	Yellow, Model 8-C-6M
Cabinet	Y4086	Gray, Model 8-C-6J
Cabinet	Y4085	White, Model8-C-6E
Cabinet	Y4087	Turquoise, Model 8-C-6L
Dial	103585	Tuning, All 8-C-5 Series
Dial	103537	Tuning, All 8-C-6 Series

RCA VICTOR MODEL 8-C-5D



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	33K	.8Ω	12Ω	24Ω	†1200Ω	†1200Ω	4.3Meg
V2	12BA6	7.6Meg	0Ω	24Ω	36Ω	†1200Ω	†1200Ω	100Ω
V3	12AV6	6.8Meg	0Ω	0Ω	12Ω	1Meg	0Ω	†470K
V4	50C5	150Ω	470K	36Ω	85Ω	470K	†1200Ω	†270Ω
V5	35W4	TP	TP	85Ω	122Ω	122Ω	117Ω	20K(Min)

† MEASURED FROM PIN 7 OF V5
TP TIE POINT

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to commom negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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